639321.0005 (MIII-103) PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit: TBD
		)	
Serial No.:	09/445,845	)	Examiner: TBD
		)	
Filing Date:	December 14, 1999	)	

Title: **AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Commissioner for Patents
Washington, DC 20231

PETITION AND FEE FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136(a)

Dear Sir:

Applicant hereby requests a four-month extension of time in which to respond to the Decision on Petition under 37 C.F.R. §1.47(b) mailed December 12, 2000, hereby extending the period for response from February 12, 2001 to June 12, 2001. Enclosed is a check for $1390.00 to cover the required fee.

The Commissioner is authorized to charge any additional fees due or credit any overpayment to Deposit Account No. 11-0231. **A duplicate copy of this sheet is enclosed.**

Respectfully submitted,

George Chaclas

Date:

George N. Chaclas, Reg. No. 46,608
Attorney for Applicant
CUMMINGS & LOCKWOOD
Four Stamford Plaza
P.O. Box 120
Stamford, CT 06902
(203) 351-4103

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit: TBD
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Commissioner for Patents
Washington, DC 20231

RENEWED PETITION UNDER 37 C.F.R. §1.47(b)

Dear Sir:

In response to the Decision on Petition under 37 C.F.R. §1.47(b) mailed December 12, 2000 (hereinafter the "Decision"), please accept the enclosed materials as a request to renew the Petition under 37 C.F.R. §1.47(b).

A petition under 37 C.F.R. §1.47(b) must be accompanied by (1) the requisite fee, (2) factual proof that the inventor refuses to execute the application, (3) a statement of the last known address of the inventor, (4) an oath or declaration by the 37 C.F.R. §1.47(b) applicant on behalf of and as agent for the non-signing inventor, (5) proof that the 37 C.F.R. §1.47(b) applicant has sufficient proprietary interest in the application, and (6) a showing that such action is necessary to preserve the rights of the parties or prevent irreparable damage.

The Decision indicated that items (1), (3), (5) and (6) above have been satisfied. The petitioner believes that these items remain fulfilled and, therefore, does not address them further by this submission. However, items (2) and (4) are addressed, in turn, below.

With respect to item (2), Mirror Image Internet, Inc. has been diligently attempting to acquire Mr. Lindbo's cooperation to sign an Oath/Declaration. (See the attached Statement of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b) executed by Timo Aittola.)

Further, a complete copy of the application with an appropriate Oath/Declaration was hand delivered to the attorney's representing Mr. Lindbo, Mr. Shub and Ms. Busny. (See the two attached Statement of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b) executed by Mary Jo Johnson and the attached letter from R. Thomas Payne dated May 9, 2001 with Exhibit Book.) As indicated the attached Statement of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b) by Mary Jo Johnson, the response from Ms. Busny on May 10, 2001 was

that Mr. Lindbo would not sign the Oath/Declaration unless he was paid money as a settlement for an unrelated matter presently in litigation.

On June 6, 2001, after placing a telephone call to Ms. Busny, Ms. Busny clearly stated that Mr. Lindbo would not sign the declaration unless Mr. Lindbo were to receive a $160,000 payment (see the attached Statements of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b) executed by R. Thomas Payne).

As previously documented, Mirror Image Internet, Inc. has already paid full value to properly acquire all right title and interest to the subject invention from Mirror Image Internet AB. Thus, the refusal of Mr. Lindbo to sign without further payment is inappropriate and clearly establishes his status as hostile within the meaning of 37 C.F.R. §1.47(b).

Clearly, petitioner has complied with the requirement to provide factual proof that the inventor refuses to execute the application (Oath/Declaration). Such factual proof is clearly demonstrated by the attached Statements of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b) and the letter from R. Thomas Payne with Exhibit Book. Accordingly, the petitioner respectfully submits that the requirements of item (2) have now been fulfilled and an immediate communication from the petitions examiner confirming same is respectfully requested.

With respect to item (4), please find a newly executed Combined Declaration Under 37 C.F.R. §1.63 and Oath/Power of Attorney. The attached Combined Declaration Under 37 C.F.R. §1.63 and Oath/Power of Attorney fulfills the requirements of 37 C.F.R. §1.63 and 37 C.F.R. §1.497. Accordingly, the petitioner respectfully submits that the requirements of item (4) have now been fulfilled and an immediate communication from the petitions examiner confirming same is respectfully requested.

In view of the remarks above and attached supporting formal papers, the petitioner believes that all the requirements for the subject Petition under 37 C.F.R. §1.47(b) have been met and, therefore, granting of the same is respectfully requested. Such action is earnestly solicited.

Respectfully submitted,

Dated: June 8, 2001

George Chaclas

George N. Chaclas, Reg. No. 46,608
Attorney for Applicant
CUMMINGS & LOCKWOOD
Four Stamford Plaza
P.O. Box 120
Stamford, CT 06902
(203) 351-4103

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639321.0005 (MIII-103) PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit: TBD
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Serial No.:	09/445,845	)	Examiner: TBD
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Filing Date:	December 14, 1999	)	

Title: **AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Commissioner for Patents
Washington, DC 20231

STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR PURSUANT TO 37 C.F.R. § 1.47(b)

Dear Sir:

I, Timo Aittola, do hereby declare that:

1. The undersigned is the Chief Financial Officer of Mirror Image Internet, Inc. and has held this position since July of 1999.

2. The undersigned is making this statement as to the facts that are relied upon to establish the diligent effort made to secure the execution of the declaration by the nonsigning sole inventor for the above-identified patent application after deposit thereof in the Patent and Trademark Office.

3. The undersigned is making this statement as I have first-hand knowledge of the facts recited herein. This statement outlines the dispute which continues to exist between Mirror Image Internet, Inc. and Mr. Lars Sverker Lindbo ("Mr. Lindbo"), a non-signing inventor who refuses to sign a Declaration/Power of Attorney for the above-identified patent application.

4. Mr. Lindbo refuses to sign the Declaration/Power of Attorney documents without payment by Mirror Image Internet, Inc. to Parfi A.B. ("Parfi") based on a financial dispute relating to leases and winding down costs that Parfi alleges Mirror Image Internet, Inc. owes Parfi, as a purported successor-in-interest to Mirror Image Internet AB, in connection with the Company's purchase of the assets of Mirror Image Internet AB on February 12, 1999. The amount sought by Parfi is $160,000.

5. The undersigned is not aware of any amount of compensation sought by or owed to Mr. Lindbo as an individual related whatsoever to the execution of an Oath/Declaration in the subject patent application.

6. On February 12, 1999, Mirror Image Internet, Inc. purchased the assets of Mirror Image Internet AB pursuant to an Agreement on the Sale and Purchase of a Business Operation dated February 12, 1999 (the "Agreement", a copy of which is attached hereto). Through Section 10 of the Agreement, Mirror Image Internet AB assigned and transferred to Mirror Image Internet, Inc. its full interest in the subject application.

7. Mr. Lindbo was an employee of Mirror Image Internet AB and the sole named inventor of the U.S. patent application at issue, which Mirror Image Internet AB assigned to Mirror Image Internet, Inc. on February 12, 1999 in the Agreement.

8. During his employment at Mirror Image Internet AB on October 12, 1998, Mr. Lindbo executed an assignment of rights to the subject patent to his employer (See copy with certified translation which is attached to the Renewed Petition under 37 C.F.R. §1.47(b) herewith) which reads in pertinent part:

> "I/we also undertake, **on request** and **without delay and special compensation**, to **sign** such documents as said owner may need to prove the transfer of rights in **different countries**." (emphasis added)

9. Mirror Image Internet, Inc. has made a final bona fide attempt at acquiring the inventor's signature consisting of providing Mr. Lindbo with a copy of the subject application and requesting Mr. Lindbo to execute the necessary Oath/Declaration pursuant to his obligation under the Swedish language assignment executed by him on October 12, 1998.

10. The undersigned is submitting this statement to describe the actions that have taken place beginning in December 2000 after the denial of a Petition under 37 C.F.R. §1.47(b) in the above-identified application.

11. In December 2000, it appeared that Mr. Lindbo would not sign the relevant documents until Mirror Image Internet, Inc. settled a dispute with Parfi AB. Therefore, in order to secure cooperation from Mr. Lindbo, the request for signature took the form of negotiations related to a settlement and release agreement involving Mirror Image Internet, Inc., Mr. Lindbo and Parfi, AB (the "parties"). The parties were beginning to reach an agreement on a business deal, but could not agree on the contents of a settlement and release agreement.

12. Settlement discussions continued during February and extended through April, 2001. During those few months, the discussions addressed potential ways to solve Mirror Image Internet, Inc.'s concerns about Mr. Lindbo's failure to sign certain documents now and in the future, including the signatures required for this application. The possibility of Mr. Lindbo's executing multiple powers of attorney was discussed during these negotiations, as was the possibility of an escrow account involving the payment of funds. The negotiations finally broke down completely around the end of April,

2001 when Mr. Lindbo (through his counsel) rejected any use of an escrow, that did not involve an immediate cash payment to Parfi of $160,000.00 as a condition for Mr. Lindbo's signing the documents needed for this and other patents. This condition was considered unreasonable in light of the fact that full and fair value had already been paid to acquire such cooperation, and as such the payment was deemed unacceptable.

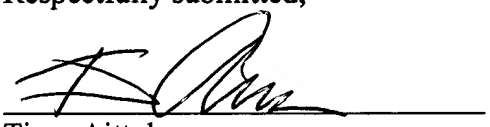
13. On May 10, 2001, we directed our attorneys, Hale and Dorr LLP, to hand deliver to Mr. Mark Shub and Ms. Elise Busny, the attorney's representing Mr. Lindbo, a copy of the application and associated Oath/Declaration in a final effort to secure his cooperation in executing the Oath/Declaration before the deadline of June 12, 2001.

14. At the time of the undersigned executing this statement, Mr. Lindbo has not cooperated, executed the Oath/Declaration or modified his demands.

15. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: June 6, 2001

Respectfully submitted,



Timo Aittola
Chief Financial Officer
Mirror Image Internet, Inc.
49 Dragon Court
Woburn, Massachusetts 01801

639321.0005 (MIII-103) PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Title: **AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Commissioner for Patents
Washington, DC 20231

STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR PURSUANT TO 37 C.F.R. § 1.47(b)

Dear Sir:

This statement is made as to some of the facts that, as I understand them, are to be relied upon to establish the diligent effort made to secure the execution of the declaration by the nonsigning sole inventor for the above-identified patent application after deposit thereof in the Patent and Trademark Office. Because the sole inventor, Mr. Lindbo, has and continues to refuse to execute the declaration, the execution of the document on behalf of the nonsigning inventor is by an entity showing a sufficient proprietary interest therein.

1. The undersigned is a partner in the law firm of Cummings & Lockwood and works at its offices at Four Stamford Plaza, 107 Elm Street, Stamford CT 06902. Attorneys at Cummings & Lockwood represent Mirror Image Internet, Inc. in various matters including Intellectual Property and, specifically, patent matters.

2. The undersigned makes the following statements as the undersigned has first-hand knowledge of the facts recited herein.

3. After being notified by Mr. Timo Aittola of the apparently complete breakdown in his efforts to obtain the execution of the declaration by Mr. Lindbo, the undersigned made an additional bona fide attempt at obtaining the execution of the declaration by Mr. Lindbo.

4. This additional bona fide attempt at obtaining the execution of the declaration by Mr. Lindbo consisted of hand delivering to Mr. Lindbo's attorneys a copy of the application and associated Oath/Declaration by representatives of Hale and Dorr LLP along with our letter of May 9, 2001 requesting that Mr. Lindbo, the inventor, execute the declaration, as stated in the Statement of Mary Jo Johnson included herewith.

5. On June 6, 2001, after placing a telephone call to Elise Busny, one of Mr. Lindbo's attorneys, Elise Busny clearly stated that Mr. Lindbo would not sign the declaration.

Respectfully submitted,

Dated: June 6, 2001

R. Thomas Payne, Reg. No. 30,674
Attorney for Petitioner
CUMMINGS & LOCKWOOD
Four Stamford Plaza
P.O. Box 120
Stamford, CT 06902
(203) 351-4192

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Washington, DC 20231

STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR PURSUANT TO 37 C.F.R. §1.47(b)

Dear Sir:

I, Mary Jo Johnson, do hereby declare that:

1. I am a senior partner in the law firm of Hale and Dorr LLP and work at its offices at 60 State Street, Boston, Massachusetts 02109. Attorneys at Hale and Dorr LLP represent Mirror Image Internet, Inc. (the "Company") in various corporate and litigation matters. I represent the Company in litigation matters.

2. I am making this statement as to the facts as I understand them that are relied upon to establish the diligent effort made to secure the execution of the declaration by the nonsigning sole inventor, Mr. Sverker Lindbo, for the above-identified patent application after deposit thereof in the U.S. Patent and Trademark Office.

3. I am making this statement as I have first-hand knowledge of the facts recited herein.

4. One recent bona fide attempt at acquiring the inventor's signature as requested by the U.S. Patent and Trademark Office consisted of a paralegal in our Intellectual Property Department, Christine M. Colbert, on May 10, 2001 hand delivering to Mr. Mark Shub and Ms. Elise Busny, the attorney's representing Mr. Lindbo, a copy of the application and associated Oath/Declaration under cover letter from R. Thomas Payne, Cummings & Lockwood, Four Stamford Plaza, P.O. Box 120, Stamford, Connecticut 06904-0120, the Company's patent counsel, dated May 9, 2001.

5. On the evening of May 10, 2001, Ms. Busny, as attorney for Mr. Lindbo, contacted the undersigned by telephone and confirmed that she had received the letter and materials

from Mr. Payne that day, but that Mr. Lindbo would not sign the relevant documents unless Mirror Image Internet, Inc. paid $160,000 to Parfi AB, which is on information and belief, a Swedish company for which Mr. Lindbo is a director.

6. On the afternoon of May 11, 2001, the undersigned returned Ms. Busny's earlier telephone call and informed Ms. Busny that Mirror Image Internet, Inc. would not pay $160,000 to resolve a dispute with Parfi AB in exchange for Mr. Lindbo's execution of the Oath/Declaration and requested that Ms. Busny prevail upon her client, Mr. Lindbo, to sign the papers, as he is obligated to do, and let Parfi and Mirror Image Internet, Inc. work out their disputes later. Further, the undersigned requested that Ms. Busny contact Mr. Payne, as patent counsel, and let him know what Mr. Lindbo is intending to do concerning the execution of the Oath/Declaration.

7. The undersigned has not heard from Ms. Busny since that conversation, and has not received any message that Ms. Busny has attempted to reach the undersigned as of the execution of this document.

8. The undersigned further declares that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Dated: June 7, 2001

Mary Jo Johnson (BBO #553419)
Hale and Dorr LLP
60 State Street
Boston, Massachusetts 02109
(617) 526-6750

639321.0005 (MIII-103) PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit: TBD
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STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR PURSUANT TO 37 C.F.R. § 1.47(b)

Dear Sir:

I, Mary Jo Johnson, do hereby declare that:

1. I am a senior partner in the law firm of Hale and Dorr LLP and work at its offices at 60 State Street, Boston, Massachusetts 02109. Attorneys at Hale and Dorr LLP represent Mirror Image Internet, Inc. in various corporate and litigation matters. I represent the Company in litigation matters.

2. I am making this statement as I have first-hand knowledge of the facts recited herein.

3. I am making this statement to outline the involvement of Lars Sverker Lindbo ("Mr. Lindbo") in several litigation matters that are currently pending against Mirror Image Internet, Inc. and/or its controlling shareholder, Xcelera, Inc. ("Xcelera"), which demonstrate Mr. Lindbo's severed relationship with Mirror Image Internet, Inc. over the last year.

4. I am a member of the litigation team at Hale and Dorr LLP that is defending two of the lawsuits against the Petitioning company and its controlling shareholder in which Mr. Lindbo is involved. As such, the undersigned has personal knowledge of the nature of these lawsuits, their current procedural posture, and the role that Mr. Lindbo has played in the prosecution of each action. The two lawsuits are as follows:

    a. Hale and Dorr LLP is counsel of record to Mirror Image Internet, Inc. in a Court of Chancery of Delaware ("Chancery Court") action entitled Parfi

Holding AB v. Mirror Image Internet, Inc., C.A. No. 18457-NC filed October 26, 2000 (the "Section 220 Action").

b. Hale and Dorr LLP is also counsel of record for defendant Xcelera Inc. ("Xcelera") in litigation entitled Parfi Holding AB, et al. v. Mirror Image Internet, Inc., et al., C.A. No. 18507-NC, filed November 15, 2000, in the Chancery Court (the "Plenary Delaware Action").

5. As a result of discovery conducted in connection with the Section 220 Action, the undersigned has knowledge of Mr. Lindbo's role in connection with a third litigation matter, which is an arbitration that Parfi Holding AB ("Parfi"), through a company called Drax Holdings AB, initiated against Xcelera in May 2000 (the "Swedish Arbitration").

6. The undersigned, on information and belief, understands that Mr. Lindbo is a director of Parfi. Parfi, together with three other plaintiffs (collectively, the "Plaintiffs"), all minority shareholders of Mirror Image Internet, Inc., initiated the Plenary Delaware Action against Xcelera, Mirror Image Internet, Inc., and three directors of Mirror Image Internet, Inc. (collectively, the "Defendants"), alleging fraud, breach of fiduciary duty, conspiracy, breach of contract, tortious interference with contract and usurpation of corporate opportunity in connection with three subscriptions for the sale of Mirror Image Internet, Inc. stock to Xcelera and one transaction involving the sale of Mirror Image Internet, Inc. stock from Xcelera to a third party. The Plaintiffs contend that these stock subscriptions diluted their Mirror Image Internet, Inc. stock and that Xcelera's sale of its Mirror Image Internet, Inc. stock usurped a corporate opportunity that belonged to Mirror Image Internet, Inc.. All five defendants have moved to dismiss this action and those motions are pending before Vice Chancellor Strine in the Chancery Court.

7. Parfi initiated the Section 220 Action against Mirror Image Internet, Inc. to obtain inspection of Mirror Image Internet, Inc.'s corporate books and records for the purported purposes of valuing Parfi's shareholding interest in Mirror Image Internet, Inc. and investigating the possibility of corporate wrongdoing in connection with the same transactions that Parfi and its co-plaintiffs have challenged in the Plenary Delaware Action.

8. On March 23, 2001, after a full trial on the merits, Vice Chancellor Strine of the Chancery Court ruled that Parfi's purported corporate investigation purpose was not bona fide, and stated:

> "Mr. Lindbo...forthrightly basically indicated that what this is about is gathering evidence to support the claims that Parfi has made in the arbitration and in the litigation... I think [this case] really is about discovery in the underlying actions. That's where I just don't think that is a proper primary purpose under Section 220, in a situation where the 220

plaintiff has already made a decision – an informed decision to initiate two pieces of litigation against the company."

9. Parfi is the lead plaintiff in the Plenary Delaware Action, the sole plaintiff in the Section 220 Action, and the real party in interest in the Swedish Arbitration, as stated in Parfi's Pre-Trial Brief in the Section 220 Action. Mr. Lindbo has been actively involved in the prosecution of the Section 220 Action and was consulted regarding and participated in Parfi's decision to pursue the Section 220 Action and the Plenary Delaware Action. Mr. Lindbo also appeared as a witness for Parfi in response to Defendant Mirror Image Internet, Inc.'s Notice of Deposition of the individual at Parfi most knowledgeable about the allegations in the Section 220 Action complaint.

10. Mr. Lindbo testified in his deposition on January 18, 2001, that he was the person at Parfi most knowledgeable about the allegations in Parfi's Section 220 Action complaint, and that he was actively involved in the decision to initiate the Plenary Delaware Action. Mr. Lindbo stated in his deposition that the transaction through which Parfi was created and was assigned shares of Mirror Image Internet, Inc. was conditional upon obtaining a Joint Prosecution Agreement with its assignor, Drax Holdings AB ("Drax") (formerly Mirror Image Internet AB, of which Mr. Lindbo was the managing director. Mr. Lindbo has further testified that he was consulted during the negotiations for the Joint Prosecution Agreement which Parfi and Drax entered in April 2000.

11. The Joint Prosecution Agreement enables Parfi and Drax and other parties to litigate against Mirror Image Internet, Inc. and Xcelera regarding the sale of Mirror Image Internet, Inc. stock to Xcelera. It also provides that Drax will at Parfi's request engage in litigation against Mirror Image Internet, Inc. regarding Mirror Image Internet, Inc.'s alleged breach of a February 12, 1999 agreement between Mirror Image Internet, Inc. and Mirror Image Internet AB (the "February 12, 1999 Agreement").

12. Mr. Lindbo explained in his deposition that the parties have a dispute over the February 12, 1999 Agreement. He explained that it concerned computers that Mirror Image Internet, Inc. "had agreed to buy and assume the lease agreements associated with the hardware and they refused to do that. That transaction has still not been completed as of today." This transaction is part of the dispute which also concerns reimbursement of certain winding down costs that on information and belief Mr. Lindbo wants resolved by payment of $160,000 before he will execute an Oath/Declaration that is required by the U. S. Patent and Trademark Office.

13. As Mr. Lindbo stated in his deposition, Parfi's principal business activity has been pursuing litigation against Xcelera and Mirror Image Internet, Inc. since its formation in June 1999. Mr. Lindbo admitted that Parfi has no employees, and no business activity other than holding Mirror Image Internet, Inc. stock and pursuing litigation against Xcelera and Mirror Image Internet, Inc.. Vice Chancellor Strine has concluded that "Parfi was formed to win the [Plenary Delaware] case."

14. Mr. Lindbo also testified at the trial in the Section 220 Action as Parfi's principal witness in an attempt to meet Parfi's burden of demonstrating that its stated purposes for seeking inspection of Mirror Image Internet, Inc.'s corporate records were bona fide, and that Parfi sought records to determine whether corporate wrongdoing had occurred in connection with the stock subscriptions and the sale of Xcelera's Mirror Image Internet, Inc. stock. Mr. Lindbo testified at length about each of the four challenged transactions that are the centerpiece of the Delaware Plenary Action, none of which challenges Mr. Lindbo's obligation to execute the requested Oath/Declaration.

15. Mr. Lindbo further testified at trial about his involvement in the Swedish Arbitration. Specifically, Mr. Lindbo testified that as the former director of Mirror Image Internet, Inc., and the former managing director of Mirror Image Internet AB (Parfi's alleged predecessor-in-interest and Mirror Image Internet, Inc.'s former parent), he executed an Underwriting Agreement on behalf of those companies with defendant Alexander Vik, pursuant to which Xcelera obtained majority ownership of Mirror Image Internet, Inc. and whose validity Parfi is challenging in the Swedish Arbitration. Mr. Lindbo further testified that Parfi is funding, directing and guiding the participation of Drax Holdings AB in the Swedish Arbitration that challenges not only validity of the Underwriting Agreement, but also seeks monetary damages for each of the stock subscriptions challenged in the Plenary Delaware Action. Numerous allegations in the Swedish Arbitration concern the negotiations of the Underwriting Agreement between Alexander Vik and Mr. Lindbo, as well as the identical allegations regarding the stock subscriptions set forth in the Plenary Delaware Action complaint that also formed the basis for the Section 220 Action, but do not challenge the obligation of Mr. Lindbo to execute the requested Oath/Declaration.

16. The Plenary Delaware Action, the Section 220 Action and the Swedish Arbitration all allege corporate wrongdoing in connection with Mirror Image Internet, Inc. stock subscriptions, the actions of its Board of Directors and Xcelera's sale of Mirror Image Internet, Inc. stock to a third party. Mr. Lindbo has already appeared voluntarily as a witness at deposition and at trial in the Section 220 Action against Mirror Image Internet, Inc. in support of those allegations; indeed, his testimony formed the centerpiece of Parfi's case, since only one other witness testified. Further, he has been consulted about the strategy for prosecuting the Swedish Arbitration. Based on Mr. Lindbo's participation in these litigation matters beginning in May 2000, and intensifying from October 2000 through the present, the ability of Mirror Image Internet, Inc. to gain Mr. Lindbo's cooperation to execute the Oath/Declaration required in this matter is severely compromised.

17. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Dated: June 7, 2001

Mary Jo Johnson (BBO #553419)
Hale and Dorr LLP
60 State Street
Boston, Massachusetts 02109
(617) 526-6750

DECLARATION

I, Kenneth Ahrengart, do solemnly and sincerely declare as follows:

That I am acquainted with the Swedish and English languages, and that the text on the following page is a true and complete translation of the document attached hereto.

AND I MAKE this solemn declaration conscientiously believing the same to be true.

Kenneth Ahrengart

Declared at Stockholm, Sweden, this 16th day of February 2001

Translation

AWAPATENT

2988435

SWEDEN
Confirmation of Assignment
Patent

I/we hereby declare that I/we on 12 October 1998 have assigned all/a share in my/our right in and to

[X] Invention

[X] Patent Application/Patent No.

[X] convention priority
(filing date, country, number)

regarding AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM

to MIRROR IMAGE INTERNET AB

such that said owner can, in his own name, apply for and obtain protection for this invention in Sweden and abroad. I/we also undertake, on request and without delay and special compensation, to sign such documents as said owner may need to prove the transfer of rights in different countries.

Place and date: Stockholm, 12 October 1998

Assignor: Sverker LINDBO

Signature

Address: Björkliden 16
SE-187 41 TÄBY

AWAPATENT

2988435

SVERIGE

Bekräftelse av överlåtelse
Patent

Härmed intygas att hela min/vår rätt till/andel i rätten till

[X] uppfinning

[X] patentansökan/patent nr

[X] konventionsprioritet/er
(inl-dag, -land, -nr)

avseende

AN INTERNET CACHING SYSTEM AND A METHOD
AND AN ARRANGEMENT IN SUCH A SYSTEM

den 12/10 1998

har överlåtits till

MIRROR IMAGE INTERNET AB

så att nämnda innehavare i eget namn kan söka och erhålla skydd för denna uppfinning i Sverige och utlandet. Jag/vi förbinder mig/oss också att vid anfordran och utan dröjsmål och särskild ersättning underteckna sådana handlingar, som nämnda innehavare kan behöva för att styrka rättsövergången i olika länder.

Ort och datum: Stockholm 1998-10-12

Överlåtare: .....
Sverker Lindbo

Adress: Björkliden 16
187 41 TÄBY

A Partnership of Professional Corporations

CUMMINGS & LOCKWOOD

Four Stamford Plaza
P.O. Box 120
Stamford, CT 06904-0120
203-327-1700
Fax 203-351-4535

Stamford
Hartford
Greenwich
New Haven
Naples
Palm Beach
Bonita Springs

May 9, 2001

R. Thomas Payne
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VIA FAX AND HAND-DELIVERY **URGENT**

Mr. Mark Shub, Esq.
Leontire & Shub
66 Long Wharf
Boston, MA 02110-3805

Re: U.S. Patent Application No. 09/445,845 entitled:
AN INTERNET CACHING SYSTEM AND
A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM
Inventor: Sverker Lindbo
Filing Date: December 14, 1999
Our Ref.: 639321.0005

Dear Mr. Shub:

We represent Mirror Image Internet Inc. in its United States patent matters. Mr. Sverker Lindbo is a named inventor on a Swedish patent application serial no. 9803246-9, now Swedish patent no. 9803246-9, for which a corresponding patent application has been filed in the United States Patent and Trademark Office, U.S. Patent Application No. 09/445,845 filed on December 14, 1999. Mr. Lindbo assigned the Swedish patent application and corresponding international applications to Mirror Image Internet AB. Our client, Mirror Image Internet Inc. acquired the rights to this Swedish patent application and the corresponding US patent application from Mirror Image Internet AB through the Agreement on the Sale and Purchase of a Business Operation dated February 12, 1999. Further, by an assignment dated November 9, 1999, Mr. Sverker Lindbo reaffirmed assigning the full and exclusive right to the invention disclosed by the Swedish application and the corresponding United States application to Mirror Image Internet Inc. (See Exhibit 2)

Our firm previously contacted Mr. Lindbo last year to obtain Mr. Lindbo's signature on certain documents to complete the formal filing requirements in the United States Patent and Trademark Office and to perfect Mirror Image Internet Inc.'s rights to the U.S. patent application. As you may recall, we received a letter from you dated March 22, 2000, indicating that Mr. Lindbo would not sign the documents without further information. We also received various email correspondence between Mr. Lindbo and our client in which Mr. Lindbo indicated his refusal to sign the documents.

Subsequently, our firm filed a petition in July 24 2000, with the United States Patent and Trademark Office under 37 CFR § 1.47, "Filing when an inventor refuses to sign or cannot be reached."

For your reference, enclosed herewith is an Exhibit Book containing the specification, English language Assignment, a Declaration, Power of Attorney and Petition, a Petition under 37 C.F.R. §1.47(b) and Decision on Petition that we filed with or received from the United States Patent and Trademark Office. The United States Patent and Trademark Office denied the petition under 37 C.F.R. §1.47(b) in its Decision on Petition dated December 12, 2000. (see Exhibit 5) As you will note, the Examiner's reason for denying the petition was based upon the offer of Mr. Lindbo to execute the required Declaration, Power of Attorney and Petition upon execution of a suitable escrow agreement.

Since that time, our understanding is that Mr. Lindbo and our client have been in negotiations with each other. However, we also understand that the ongoing negotiations between Mr. Lindbo and our client recently reached a stalemate and that Mr. Lindbo will not execute any documents absent the immediate payment of funds by our client to satisfy alleged claims by Parfi AB unrelated to the intellectual property of our client.

Unfortunately, we have a non-extendable deadline of June 12, 2001 in which to file an executed Inventor's Declaration or the application will go abandoned. Thus, we are again requesting that Mr. Lindbo sign the attached Inventor's Declaration, Power of Attorney and Petition.

We realize that this request is made shortly before this non-extendable deadline, but we were previously informed that the parties were resolving their differences and expected to have a resolution well before this **June 12, 2001** deadline.

Whether or not the parties have unresolved disputes over their rights, unless the attached Inventor's Declaration, Power of Attorney and Petition is properly executed by Mr. Lindbo and received by the United States Patent and Trademark Office on or before **June 12, 2001**, there will be no rights to determine.

Therefore, please have Mr. Lindbo execute the attached Declaration, Power of Attorney and Petition, then send a copy to us immediately by facsimile. Additionally, please provide us with the original by overnight courier. **As noted above, it is critical that the filing formalities of the application be completed and filed with the United States Patent and Trademark Office by the non-extendible deadline of June 12 2001 otherwise the application will become abandoned.**

If you have any questions or require additional information, please do not hesitate to contact us. I have asked the law firm of Hale and Dorr LLP to hand deliver the enclosed materials to you on May 10, 2001.

Sincerely,

Tom Payne /gc

R. Thomas Payne

Enclosures: Exhibit Book, Declaration
cc: Elise Busny w/ encls.;
Timo Aittola w/o encls.

.StmLib1:885183.1 05/09/01

U.S. Patent Application No. 09/445,845
Exhibit Book for Mr. Sverker Lindbo

Cummings & Lockwood
Four Stamford Plaza
107 Elm Street
Stamford, CT 06904

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AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM

Technical field of the invention

The present invention refers to an Internet caching system and to an arrangement and a method for serving requests for Internet information files in an Internet caching system.

Background art

The Internet and its currently most used feature, the World Wide Web (WWW), has in recent years developed into an enormous source of information. Anybody can provide any information, such as text, pictures, audio and video, on the World Wide Web where it can be easily retrieved by users anywhere in the world as long as they have access to the Internet.

The major problem facing the Internet is the growing demand for communication capacity as users access information from anywhere in the world. It is estimated that the World Wide Web traffic already exceeds all conventional telephone and facsimile traffic on most international communication lines. More transmission and switching capacity is continuously added, but it is a slow and expensive process and demand continues to outstrip supply.

The content of the World Wide Web is getting to be unmeasurable and probably comprises several hundreds of Terabytes (as of summer 1998). However, a relatively small subset of all this information accounts for a huge portion of the information actually being accessed. Therefore, in order to minimize bandwidth used and latency involved when accessing information on the Internet, different caching techniques are currently in use for limiting the amount of information that has to be

transferred over the Internet and for limiting the distance over which the information is transferred.

In the field of caching WWW objects, or Internet information files, there are basically two approaches, client side caching and server side caching. The simplest form of client side caching is virtually used by every WWW browser today. The browser retains a cache on the user's computer with the last accessed Internet information files. When the user for a second time wishes to access a particular information file, the browser retrieves it from its cache rather than making a request for it over the Internet.

In order to help a neighboring user, a proxy server caching method, another form of client side caching, can be used. In this scheme a cache is placed at a WWW proxy node to which a number of neighboring users are connected, such a proxy node could for example be a server located at a company. When a WWW client wants to access a WWW server on the Internet, the client sends a http request to the proxy node, or WWW proxy server, rather than sending it directly to a server on the global Internet. Instead it is the proxy server that sends the request to a WWW server on the global Internet, caches the response and returns the response to the client. Thus, the first time an information file is requested it is transferred over the Internet and stored in the cache of the WWW proxy server. Subsequent requests for the same information file from any client connected to the WWW proxy server can then be resolved locally, rather than making http requests to a WWW server over the global Internet. Proxy server caching can also be used outside the premises of a company, or some other organization, by implementing the scheme described above at a regional Internet cache server to which a number of clients are directly or indirectly connected.

Depending on the size and homogeneity of a user community using a cache at a server, about 20-40 Giga-

bytes of cache storage will (spring 1998) reduce the Internet traffic generated by the user community by 30-50 %. As the growth of the information provided by the Internet and the WWW continues, it is highly likely that the required cache size will have to increase over time to retain the hit rate, i.e. the proportion of the information files requested that are transferred from the cache server. Furthermore, it would give significant benefit for the performance and utilization of the Internet if the hit rate could be increased to 75% or more. With the typical end user behavior, this would require a much larger cache, currently in the order of 200-400 Gigabytes, but also require very many members in the end user community, currently several hundreds of thousands. The reason is that the larger the end user community, the larger the probability that someone else within the community has previously accessed a requested file, especially if the users share some common interest.

Installing a large cache is easily achieved by acquiring the appropriate computer and the appropriate disk capacity. However, it is also required that the cache is able to handle all requests from the participating end users. Using current technology, it is not possible for one single processor computer to serve the requests from several hundred thousand end users. Hence, several systems have been presented to deal with this problem, here outlined under the names of their major proponents.

Cisco Systems, Inc. proposes that the end users are connected to a backbone router which is programmed to transparently redirect all WWW requests to a group, or "Farm" of dedicated cache appliances, or "Cache Engines". Each Cache Engine handles a subset of all origin WWW servers, based on grouping of the IP (Internet Protocol) addresses. The solution scales up to 32 Cache Engines in parallel, which corresponds to serving approximately 500.000 subscribing end users.

Inktomi Corporation suggests that a switch, a so called layer 4 switch, is used to redirect all requests for WWW pages to an "Inktomi Traffic server". A cluster of powerful computers are used, which all share the same disk storage system. This solution scales up to 16 parallel workstations, which also corresponds to about 500.000 subscribing end users. However, having several computers accessing the same disk storage system adds complexity and requires management, i.e. some of the capacity of each computer is not available for processing requests.

Network Appliance, Inc. proposes a two tier caching solution. The system has several local caches near the end users. These local caches communicate with a central cache using the Internet Cache Protocol (ICP) when a cache miss occurs at the local level. If the requested file is present in the central cache, it will be transferred to the local cache and then forwarded to the end user. If the requested file is not in the central cache either, the central cache will make a request to the origin server and forward the file to the local cache, which in turn forwards the file to the end user. The central cache thus handles ICP requests from the local caches and communicates with the origin server in the case of a cache miss at the central cache. For scaleability, there can be several central caches in parallel, each handling a subset of the origin servers. This means that the local caches are able to address each request to the correct central cache server. Since this protocol is not standardized, it means that all local caches have to be delivered from Network Appliance, Inc.

All of these solutions have the drawback that a central cache server needs to handle extensive communication in one way or another. This results in low utilization of the server's capacity and difficulties in serving hundreds of thousands users, which is required in order to obtain a high hit rate. By adding more servers,

the systems are made more expensive and more complex. The complexity of the system adds to the overhead and, hence, to a low utilization of the relatively expensive resources that the servers represent.

Summary of the invention

An object of the present invention is to overcome the drawbacks with the presently known techniques for caching information files on the Internet and to provide a solution for caching information files in a cost-effective way.

Another object of the present invention is to provide a solution for how user's requests for cached information files are to be served by a caching system in a fast and cost-effective way.

Yet another object is to provide a cache server solution which is able to cope with the growing numbers of information files being provided by the Internet and the World Wide Web.

Yet another object is to provide a solution for obtaining a high hit rate percentage for information file requests directed to a caching system with a minimum of cost.

Yet another object of the present invention is to provide a scaleable caching system which is scaleable in a standardized way.

The above objects are achieved by an Internet caching system and a method for serving requests for Internet information files in an Internet caching system in accordance with the appended claims.

According to a first aspect of the invention, there is provided a method for serving requests for Internet information files in an Internet caching system, which method comprising the steps of receiving, at a local Internet cache server, a user request from a user for an Internet information file; in response to the received request, making a query for said information file, if

said information file has not been cached by said local server; in response to a reply to said query, making a file request for said information file, wherein said file request is directed to a feeder means if said reply indicates that a central file server, storing cached Internet information files, has said information file cached; and querying, from said feeder means in response to said file request, said central file server for said information file, in order to decrease the load on said central file server.

According to a second aspect, there is provided an arrangement in an Internet caching system, said system comprising at least one local cache server and at least one central file server, both of which servers stores cached Internet information files, which arrangement, for decreasing the load on said central file server, includes a Feeder communicating with said local cache server and with said central file server, wherein said Feeder includes first means for receiving a request for an Internet information file from said local cache server; second means for deriving a query from an alphanumerical string received from said local cache server; and third means for querying said central file server for said Internet information file using said query derived by said second means.

According to a third aspect, there is provided an Internet caching system, which system comprises a set of local Internet cache servers, wherein each local cache server is arranged to receive requests from users for Internet information files; at least one central file server included in a central cache site and storing cached Internet information files; and feeder means interconnecting said set of local cache servers with said central file server, said feeder means including at least one Feeder, which Feeder comprises means for communicating with at least one local cache server in accordance with a protocol used for communicating between Internet

cache servers and means for retrieving Internet information files from said central file server using data base queries, thereby decreasing the load on said central file server.

The invention is based upon the idea of connecting a number of dedicated computers to a central file server, or central cache server, storing Internet information files. Relative to the central cache server, these additional computers are low end computers. The dedicated computers are arranged to decrease the load on the central cache server by performing some of the tasks normally handled by the central cache server itself. In this way the central cache server is able to serve the local cache servers connected to the central server, or rather connected to the central server via the dedicated computers, in a fast and cost-effective way. Maximum use is made of the expensive hardware forming the actual central file server and its file repository in which the files are cached, while specialized inexpensive machines around the file server perform time consuming and time critical tasks in parallel.

Thus, the inventive feeder means, or Feeders, are realized by machines being separate from any machine realizing a central file server. This will decrease the load on the central file server, which then is able to dedicate more processing time to the actual retrieval of cached information files. Hence, the central file server is able to serve a large community of users in an efficient way. Since user requests, via requesting local cache servers, are served more effectively, the number of user requests served can be increased, which in turn enables the central file server to obtain a higher hit rate percentage for its cache.

According to an embodiment of the present invention, the feeder means communicates with the local cache servers, on behalf of the central file server, in accordance with a protocol used for communicating between

Internet cache servers. The currently used protocol is either the Internet Cache Protocol (ICP) or the Cache Digest, but could be any other conventional or future protocol used for the same purpose. Thus, by placing the task of accepting, and replying to, queries and/or requests for information files in machines being separate from the central file server machine, the load on the central file server is decreased considerably.

When a local cache server receives a request from a user for an information file, which file has not been cached at the local server, the local server starts with making a query for that file. In one embodiment the query is directed to a table, or data base, being internal to, or directly connected to, the local server. If said table indicates that the queried file is cached by the central file server, the local server will request the file from the feeder means, or Feeder. This querying and requesting is then preferably performed in accordance with the Cache Digest protocol. However, as with the request from the user to the local server, the request from the local server to the Feeder may be in accordance with any layer three protocol, for example an HTTP request.

In another embodiment, the query from the local server is directed to the Feeder. Included in the query, for example an ICP query, is the URL of the queried information file. The Feeder derives a query number from the alphanumerical URL of the received query for an information file, which query number then is used by the Feeder for querying the central file server for the information file. The Feeder queries the file server for information files using a standard SQL query (Structured Query Language). If the queried file is present at the central file server, i.e. if there is a cache hit, the queried file is transferred from the central server, via the Feeder, to the local server. To have the central file server initiate a file transfer as an answer to a SQL query, rather than as an answer to a query, such as an

ICP query, from the local cache server, means considerable capacity savings at the central file server.

Alternatively, the query number is derived from said alphanumerical URL and from a part of a header information included in said query. This part of the header information contains specific user information of the original requester, for example, the language he is using, enabling the central file server to respond in accordance with this specific information. The query number corresponding to an information file is derived by using any hash algorithm, preferably using an MD5 hash algorithm.

In the embodiment where the local server makes an internal query for the information file, the Feeder derives the query number from the following request directed to the Feeder by the local server. The alphanumerical string used for deriving the query number is the string included in said request, for example the URL of an HTTP request. The query number is then used by the Feeder when querying the central file server for the information file, preferably using an SQL query. Again, it is advantageous to also include at least part of an header information field of said request as the basis for deriving said query number.

In order to decrease the load on the central file server even further, the Feeder preferably includes a table storing information relating to each information file being cached by the central file server. The table, for example, being a memory resident MD5 indexed hash table. By searching said table, the Feeder can conclude whether or not a queried information file is cached by the central file server, without having to query the server, and, hence, a faster reply may be given by the Feeder to the query from a local server.

According to another embodiment of the present invention, the Internet caching system further comprises updater means, or an Updater, for updating the set of

information files being cached by the central file server. The updating procedure consists of transferring a copy of a file cached at a local server to the central server. The transferred file is a file which, as a consequence of a cache miss at the central server when querying for the file, has been retrieved from its origin server by the local server and then been cached by the same.

Thus, the central file server, or central cache server, does not itself retrieve a non-cached file and is therefore not burden with having to make a request to an origin server for a file because of a cache miss when serving a local cache server. Instead, when the Feeder evaluates a query from the local cache server for an information file, and concludes that the queried file is not cached at the central file server, the Feeder directs a reply to the querying local server, indicating that the file is not available, and then orders the Updater to update the central file server. Upon reception of the reply, which thus indicates a cache miss, the local cache server retrieves the file in question from its origin server. Upon reception of the order to update the central file server, the Updater requests a copy of the file from the local server and transfers the thereby received file copy to the central cache server where it is stored. The transferring and storing procedure is preferably performed at a time when the overall load on the central file server is low, and when the local server has been given enough time to retrieve the file from its origin server.

However, should the local server be located behind a firewall, the Updater will request a copy of the file from its origin server, which copy then is stored in the central cache server. In this case, it is preferred that the Feeder does not order the Updater to commence the updating procedure until after a certain number of queries for the same particular information file have

been received, where these queries originate from local servers being located behind firewalls. Preferably, the Updater is realized by a machine being separate from the machines realizing the Feeders, as well as being separate from any file server machine. This is an advantage since file requests, for example HTTP requests, to origin servers may take unpredictable amounts of time and thus lead to an unpredictable load on the machine performing the requests. However, in a simplified system it is possible to realize the Updater in the same machines as those which realize the Feeders, while still being separate from any central file server machine. In an embodiment where the machines implementing the Updater and the Feeders interconnects the local cache server with the central file server, without the machines themselves being included in the central cache site together with the central file server, the separation of these machines from the central file server machine is evident.

Certain Internet information files are not suitable for caching. Such files are sometimes called dynamic information files, the term dynamic comes from that these files are continuously updated at the origin server, examples of such files are files with stock quotes, weather reports and so on. One preferred way of treating the existence of dynamic files is to uphold a list of known uncachable files in either the Updater or in the local servers. In this way the communication in the system, as a result of a user requesting such a file, can be minimized.

According to yet another embodiment of the present invention, several central file servers are included in a central cache site, each file server caching information files associated with original host names, IP-addresses or derived query numbers, within a defined range. Based upon either the original host name, IP-address or the derived query number of a requested information file, the Feeder addresses the query to the file server caching

files in the appropriate range. In this scaleable solution each file server has its own disk system, thus minimizing overhead. Furthermore, the central cache site is scaleable with third party file servers because of the standardized protocols used by the site.

In order for the communication between the central file server and the low end computers, i.e. the Feeders and the Updaters, to be fast, each low end computer is preferably connected to the central file server by means of a dedicated wire, alternatively, if there are several file servers, by means of a dedicated network. This network is either a private or a public network. In the latter case, at least part of the network capacity is preferably reserved for the communication in question. The network used can, of course, also be a part of the Internet, also in a non-dedicated way. The type of connection used between the central file server and the low end computers is very much dependent upon where the low end computers, or Feeders and Updaters, are located, at the same site as the central file server, or, at a location being different from the location of the central file server.

Moreover, it is preferred that the central cache site serves a defined set of local cache servers, which set in turn serves a linguistically and culturally homogenous user community. This will further increase the hit rate percentage at the central cache level since it is more likely that the same information files are requested more than once.

Using the present invention, an operator of an Internet caching system, handling information file requests in accordance with the present invention, is able to provide a fast, cheap and effective way of serving a large number of subscribing customers. These customers preferably being different Internet service providers, companies or other organizations connected to the inventive central cache site, or inventive Feeders/

Updaters, with their own local cache servers, or, being connected as clients to a system encompassing the whole inventive caching system formed by the central cache site, including Feeders and an Updater, and its connected local cache servers. Of course, a customer may very well also be a single user constituting a single WWW client connected directly to the inventive system. Also, a large company or Internet service provider can choose to operate the inventive system on its own rather than being connected to such a system being operated by another party. Furthermore, since the inventive caching system is built around standardized protocols, such as ICP and SQL, local cache servers and central file servers from any manufacturer can be included in the system as long as these protocols are supported.

Within the scope of the present invention a local Internet cache server is to be interpreted as a proxy node, preferably a WWW proxy node, retaining a cache for the users, or WWW clients, connected to the proxy node.

Items cached on a local Internet cache server or a file server at a central cache site are any non-dynamic files which are accessible using the Internet and containing any type of information. Thus, a number of different type of files and different namings of such files are included by the term Internet information file used in the present invention, such as binary, text, picture, audio and video files, HTTP (HyperText Transfer Protocol) files, WWW files, FTP (File Transfer Protocol) files, WWW pages, WWW objects, and so on. Besides files being accessed using the HTTP or FTP protocol, any file being accessed over the Internet in accordance with any layer 3 protocol is also included by the term Internet information file. A further example of a protocol that can be used is the WTP protocol (Wireless Transport Protocol) used within the WAP (Wireless Application Protocol) standard.

According to a fourth aspect of the present invention, the invention encompasses a computer-readable medium, on which is stored one or several computer programs of instructions for one or several general purpose computers, comprising means for enabling said one or said several computers to perform the steps disclosed in the appended claims 1 - 17.

According to a fifth aspect of the present invention, the invention encompasses one or several program storage devices containing one or several sequences of instructions, for one or several general purpose computers, for performing the steps disclosed in the appended claims 1 - 17.

The above mentioned and further aspects and features of, as well as advantages with, the present invention, will be more fully understood from the following description, with reference to the accompanying drawings, of exemplifying embodiments thereof.

Brief description of the drawings

Exemplifying embodiments of the invention will now be described below with reference to the accompanying drawings, in which:

Fig. 1 schematically shows an embodiment of an Internet caching system according to the present invention;

Fig. 2 schematically shows another embodiment of an Internet caching system according to the present invention;

Fig. 3 schematically shows a flow chart of the operations performed by a local cache server in Fig. 2;

Fig. 4 schematically shows a flow chart of the operations performed by a Feeder in Fig. 2;

Fig. 5 schematically shows a flow chart of the operations performed by an Updater in Fig. 2; and

Fig. 6 schematically shows yet another embodiment of an Internet caching system according to the present invention.

Detailed description of preferred embodiments

With reference to the block diagram shown in Fig. 1, an embodiment of the present invention will be described. In Fig. 1 a number of local cache servers 100 are shown. These local servers 100 are, via the Internet, connected to feeder means 110, here exemplified with a Feeder 110. The number of Feeders 110 and the number of local cache servers 100 indicated in Fig. 1 is merely an example, and the embodiment is not restricted to these numbers.

However, regardless of the number of Feeders, each Feeder is in this embodiment connected to one single central file server. In Fig. 1 Feeder 110 is connected to a central file server 130. This central file server includes a storage medium (not shown) on which Internet information files are stored, i.e. cached, and is implemented by a high end computer, such as a Sun Ultra Sparc or DEC Alpha Computer. Each Feeder 110 on the other hand is implemented by a low end computer, such as a conventional Personal Computer, and constitutes a front end machine which handles the communication between the local cache servers 100 and the central file server 130.

The Feeder 110 communicates with the local cache servers 100 using the Internet Cache protocol, which is a message based protocol used for communicating between cache servers over the Internet. Hence, the Feeder 110 replies to an ICP query for a cached Internet information file, the query being received from one of the local cache servers 100, with an ICP reply. This ICP reply indicates either a cache hit (ICP_OP_HIT) or a cache miss (ICP_OP_MISS).

In accordance with the Internet Cache Protocol, the ICP query received by the Feeder includes the URL of the queried information file. From this URL the Feeder 110

derives a query number, corresponding to the queried information file, using an MD5 hash algorithm. Using the query number, a memory resident MD5 indexed hash table 115 is then searched. Included in the Feeder 110 is a RAM (Random Access Memory) 116 in which the indexed table is stored. The indexed table 115 comprises an entry for each query number corresponding to an Internet information file cached at the central file server 130. Searching the indexed table 115 comprises searching the entries for a query number matching the derived query number. If a matching query number is found in the table, this is an indication that the queried information file is cached by the central file server 130, and, as a consequence, the ICP rely to the local server 100 will indicate a cache hit. Correspondingly, if a matching query number is not found in the table 115, this indicates that the queried information file is not cached by the central file server 130, and, as a consequence, the ICP reply will indicate a cache miss.

The means for deriving the query number using the MD5 hash algorithm and for searching the indexed table is a microprocessor 120, together with an appropriate software module, included in the Feeder 110. The microprocessor executes the software module, which execution results in derived query number and in a search of the indexed table 115. The implementation of this software module is straight forward for a person skilled in the art of programming.

If the reply from the Feeder 110 to the local server 100 indicates a cache hit, the local server will request the information file from the Feeder using the HyperText Transfer Protocol, which is a protocol used for accessing WWW objects over the Internet. That is, an HTTP request is transmitted to the Feeder, which request includes the URL of the requested file.

When communicating with the central file server 130, the Feeder 110 uses common SQL queries. Upon reception of

the HTTP request, the Feeder will retrieve the query number which was previously derived from the URL of the corresponding ICP query. Alternatively, the URL of the HTTP request is used for once again deriving the query number. The Feeder then uses the query number in a standard SQL query directed to the central file server. As a response, the central file server 130 will transfer the information file in question to the Feeder 110, which in turn transfers the information file to the local server 100 that issued the request for the file.

If the reply from the Feeder 110 to the local server 100 indicates a cache miss, the local server will make an HTTP request to the origin server (not shown) of the requested file, cache the then received file and transfer a copy of the file to the requesting user (not shown).

The means for implementing the execution of the Internet Cache Protocol in the Feeder 110 is the microprocessor 120 included in the Feeder. The microprocessor also implements the means for receiving an HTTP request from the local server 100 as well as the means for querying the central file server 130 using the SQL. The operations to be performed by the microprocessor are controlled by appropriate software modules, being part of the abovementioned means. The implementation of these software modules would be well known for a person skilled in the art of programming and being familiar with the protocols in question.

Another embodiment of an Internet caching system according to the invention is described with reference to Fig. 2. The system in Fig. 2 differs from the one shown in Fig. 1 in that the Internet caching system comprises an Updater 240, i.e. updater means, being connected to the central file server 230, the Feeder 210 and, via the Internet, the local cache servers 200. Thus, Fig. 2 illustrates the inventive arrangement encompassing an Updater 240 as well as a Feeder 210.

Besides what is being described below regarding the elements in Fig. 2, the elements of Fig. 2, having corresponding elements in Fig. 1, operate and interact in accordance with what has previously been described with reference to Fig. 1. Therefore, only the features of these elements being of relevance to the embodiment illustrated by Fig. 2 are described below.

The Updater 240 is responsible for updating the storage medium (not shown) associated with the central file server 230 with new cached information files. As described with reference to Fig. 1, when the local server 200 receives a cache miss in an ICP reply from the Feeder 210, as a response to a previous ICP query to the same, the local server 200 makes an HTTP request for the file to its origin server (not shown). The requested file is then received and cached by the local server 200. After a predetermined time, as a consequence to the reported cache miss in the ICP reply, the Feeder 210 will instruct the Updater 240 to update the central file server.

The Updater 240 receives, from the Feeder 210, the URL of the queried file and the identity of the local server 200 which queried for the file. An HTTP request for the file is then made from the Updater to the specific local server. Upon reception of the requested file, the Updater stores, i.e. caches, the file at the central file server 230. When the file has been stored, the Updater instructs the Feeder to add the query number corresponding to the file in question in the indexed table 215 stored in the RAM area 216.

The means for requesting the information file from the local cache server 200 and the means for caching the received information file at the central file server 230 is a microprocessor 260, together with appropriate software modules, included in the Updater 240. The implementation of these software modules would be well known for a person skilled in the art of programming.

An example of the operations performed by a local cache server 200 in the embodiment of Fig. 2 will now be described with reference to the flow chart in Fig 3.

In step 300 the local cache server 200 receives a request for an Internet information file from a client served by the particular local cache server. However, the file request may also be received from the Updater 240, which operates in accordance with the description referring to Fig. 5. The local cache server then in step 301 searches its locally cached files for the file requested. If it finds the file, the file is transferred to the requesting client or to the Updater 240, this is indicated with step 302.

If the local cache server 200 does not find the requested file during the search, i.e. it has not cached the requested file, it examines in step 303 if the request came from the Updater. If this condition is true, a message is returned to the Updater in step 304 indicating that the requested file is not available. If the conditional step 303 is false, i.e. if the request came from a client, an ICP query is sent in step 305 to the Feeder 210. In the next step 306, the local cache receives an ICP reply from the Feeder 210 indicating whether or not the central file server 230 has the requested file cached. In step 307 the ICP reply is evaluated. If the reply indicates a cache miss, i.e. the requested file was not centrally cached, the local cache server 200 makes a HTTP request for the file directed to the origin server of the file. If the reply on the other hand indicates a cache hit, the local cache makes a HTTP request to the Feeder 210 for the file, this is indicated with step 309. In the next step 310, the local cache server receives the requested file from the Feeder. Finally, in step 311, the file is transferred to the client which requested the file.

The operations performed by the Feeder 200 in the embodiment of Fig. 2 is now described with reference to the flow chart in Fig. 4.

In step 400 the Feeder 210 receives an ICP query regarding an Internet information file from any of the local cache servers 200 being handled by the Feeder. The query includes the URL of the queried information file. From this URL the Feeder 210 in step 401 derives a query number using an MD5 hash algorithm, which query number is used in step 402 when searching an indexed MD5 hash table being resident in the memory 216 of the Feeder 210.

If the number is not found during the search in the hash table, the Feeder in step 403 sends an ICP reply indicating a cache miss back to the local cache server 200 from which the ICP query was received. In step 404 the Feeder 210 then orders the Updater 240 to retrieve the non-cached queried file by passing the URL of the queried file to the Updater. In step 405 the Feeder 210 adds the query number corresponding to the queried file in the indexed hash table 215. This is done in response to that the Updater 240 indicates to the Feeder that the queried file has been transferred from the local server 200 and stored in the central file server 230. The operation of the Updater 240 will be further described with reference to Fig. 5.

If the Feeder 210 in the conditional step 402 finds the query number during the search in the hash table 215, it will in step 406 send an ICP reply indicating a cache hit back to the local cache server 200 from which the ICP query was received. In step 407 the Feeder then receives an HTTP request from the local cache server 200 which previously issued the ICP query. Similar to the ICP query, the HTTP request includes the URL of the requested information file. In step 408 the Feeder 210 retrieves the previously derived query number corresponding to the file. With this query number the Feeder in step 409 queries the central file server 230 for the requested

information file using a standard SQL query. In step 410 the Feeder as a response receives the cached information file from the central file server 230, and in the next step 411, the requested cached Internet information file is transferred from the Feeder 210 to the requesting local cache server 200.

The operations performed by the Updater 240 in the embodiment of Fig. 2 is now described with reference to the flow chart in Fig. 5.

In step 500, the Updater 240 receives an order from the Feeder 210 indicating that a particular file should be requested. The file in question was previously requested by the local cache server 200, but the Feeder found that the central cache server 230 had not cached the file. The order includes the URL of the file as well as the address of the local cache server 200 which requested the file from the central cache 230. The Updater will then, in step 501, check the requested file of the order against a list of known uncachable files. If the list contains the requested file, the order will be discarded. If the list does not contain the requested file, the order is put on a hold by the Updater 240 so that there will be time for the local cache server 200 to retrieve the file from its origin server.

At a time convenient to the central file server 230, i.e. at a time with relative low load on the central server, the central server sends a message to the Updater 240 stating that any pending order should be executed, the reception of this message at the Updater 240 is indicated with step 502. In the next step 503, the execution of the order starts with that the Updater requests a copy of the file, which now should have been retrieved and cached locally, from the local cache server 200 from which the file request originated. A copy of the file is then received from the local cache server in step 504. In step 505, the received file copy is transferred to the central file server 230 to be cached by the same. In the

final step 506, the Updater 240 instructs the Feeder 210 to add the query number corresponding to the file cached at the central file server 230 to the indexed hash table 215.

The operation of the central file server 230 is straight forward. Basically it does two things, it answers SQL queries from the Feeders 210 by transferring cached files to them, and, it stores new information files in its cache, which files are transferred to it from the Updater 240.

Another exemplifying embodiment of an Internet caching system according to the present invention is now described with reference to Fig 6. In Fig 6, the system differs from the one shown in Fig 2 in that the system has more than one central file server, here being exemplified with three central cache servers 630. Also, Fig. 6 includes two Feeders 610, each of which is connected to its own set of local cache servers 600. The Feeders 610 and the Updater 640 are arranged together with the central file servers 630 at a central cache site 690. By means of an Ethernet network 680 arranged within the central cache site, the Updater 640 and each Feeder 610 are connected to all central file servers 630.

The additional number of central file servers in this embodiment enables more files to be cached and even more SQL queries to be answered by the central file servers in comparison with the embodiment of Fig. 2. Since the system is completely scaleable, any number of Feeders, Updaters or central file servers can in theory be added to the system.

The basic difference of the operation of the system in Fig. 6 to that of the system in Fig. 2 is that a Feeder 610 need to select one server, out of the plurality of central file servers 630, to which an SQL query should be directed. Each central file server 630 caches information files within original host names within a predefined range. Therefore, the selection of one of the

central file servers is done in accordance with the host name included in the URL received from the local server, either as part of an ICP query or as part of an HTTP request. When one of the central file servers has been selected by the Feeder, the SQL query with the derived query number is directed to that selected file server.

It is understood that the construction and function of the elements described with reference to the drawings will become apparent for those skilled in the art.

Even though the invention has been described with reference to specific exemplifying embodiments, many different alterations, modifications and the like will become apparent for those skilled in the art. The described embodiments are therefore not intended to limit the scope of the invention, as defined by the appended claims.

CLAIMS

1. A method for serving requests for Internet information files in an Internet caching system, comprising the steps of:

receiving, at a local Internet cache server, a user request from a user for an Internet information file;

in response to the received request, making a query for said information file, if said information file has not been cached by said local server;

in response to a reply to said query, making a file request for said information file, wherein said file request is directed to a feeder means if said reply indicates that a central file server, storing cached Internet information files, has said information file cached; and

querying, from said feeder means in response to said file request, said central file server for said information file,

in order to decrease the load on said central file server.

2. The method as claimed in claim 1, wherein said query is performed by said local cache server in accordance with a protocol used for communicating between Internet cache servers.

3. The method as claimed in claim 2, wherein said protocol is the Internet Cache Protocol (ICP).

4. The method as claimed in claim 2, wherein said protocol is the Cache Digest.

5. The method as claimed in any one of claims 1 - 3, wherein said query is directed by said local cache server to said feeder means, which feeder means as a response returns said reply.

6. The method as claimed in 5, comprising the step of deriving, at said feeder means, a query number corresponding to said information file being concerned in said query.

7. The method as claimed in 6, wherein said querying step comprises using the derived query number when querying said central file server for said information file.

8. The method as claimed in claim 6, wherein said query provides an alphanumerical string associated with said information file, said string being used in said step of deriving said query number.

9. The method as claimed in claim 8, wherein said alphanumerical string is a Uniform Resource Locator (URL) and said query number is derived from said URL and at least part of a header information field of said query.

10. The method as claimed in any one of claims 1, 2 or 4, wherein said file request provides an alphanumerical string associated with said information file, said string being used by said feeder means for deriving a query number corresponding to said information file.

11. The method as claimed in claim 10, wherein said alphanumerical string is a Uniform Resource Locator (URL) and said query number is derived from said URL and at least part of a header information field of said file request.

12. The method as claimed in any one of the preceding claims, comprising the step of creating an indexed table having an entry for each Internet information file being cached at said central file server.

13. The method as claimed in claim 12, comprising the steps of:

performing a search in said indexed table for said information file; and

indicating in said reply to said query whether or not said information file was found during said search.

14. The method as claimed in any one of the preceding claims, wherein said querying step comprises using the Structured Query Language (SQL) when querying said central file server for said information file.

15. The method as claimed in any one of the preceding claims, wherein said querying step comprises the steps of:

selecting, based upon an original host name or IP-address of said information file, a central file server out of a set of central file servers, each server of said set being arranged to cache Internet information files with original host names or IP-addresses within a predefined range; and

querying the selected central file server for said information file.

16. The method as claimed in any one of claims 6 - 14, wherein said querying step comprises the steps of:

selecting, based upon said query number derived for said information file, a central file server out of a set of central file servers, each server of said set being arranged to cache Internet information files with corresponding query numbers within a predefined range; and

querying the selected central file server for said information file.

17. The method as claimed in any one of claims 1 - 16, comprising the further steps of:

retrieving, at said local cache server, said information file from its origin server if said reply to said query indicates that said information file is not cached at said central file server;

caching said information file at said local cache server; and

updating said central file server by requesting a copy of said information file from said local cache server and caching said copy in said central file server.

18. An arrangement in an Internet caching system, said system comprising at least one local cache server and at least one central file server, both of which servers stores cached Internet information files, which arrangement, for decreasing the load on said central file server, includes a Feeder communicating with said local cache server and with said central file server, wherein said Feeder includes:

first means for receiving a request for an Internet information file from said local cache server;

second means for deriving a query from an alpha-numerical string received from said local cache server; and

third means for querying said central file server for said Internet information file using said query derived by said second means.

19. The arrangement as claimed in claim 18, wherein said first means is arranged to operate in accordance with a layer three Internet protocol.

20. The arrangement as claimed in claim 18 or 19, wherein said third means is arranged to use the Structured Query Language(SQL) when querying for said Internet information file.

21. The arrangement as claimed in any one of claims 18 - 20, wherein said alphanumerical string is included in said request received from said local cache server.

22. The arrangement as claimed in claim 21, wherein said query is derived from said alphanumerical string and at least part of a header information field of said request received from said local cache server.

23. The arrangement as claimed in claim 22, wherein said query comprises a query number, the query number being derived by applying a hash algorithm to said string and to said part of said header information field.

24. The arrangement as claimed in any one of claims 18 - 20, wherein said Feeder includes:

fourth means for receiving a query for an Internet information file from said local cache server; and

fifth means for providing said local cache server with a reply to the received query.

25. The arrangement as claimed in claim 24, wherein said fourth means and said fifth means are arranged to operate in accordance with a protocol used for communicating between Internet cache servers.

26. The arrangement as claimed in claim 25, wherein said protocol is the Internet Cache Protocol(ICP).

27. The arrangement as claimed in any one of claims 24 - 26, wherein said alphanumerical string is included in said query received from said local cache server.

28. The arrangement as claimed in claim 27, wherein said queryderived by said second means is derived from said alphanumerical string and at least part of a header

information field of said query received from said local cache server.

29. The arrangement as claimed in claim 28, wherein said query comprises a query number, the query number being derived by applying a hash algorithm to said string and to said part of said header information field.

30. The arrangement as claimed in one of claims 24 - 29, wherein said Feeder includes a table with a copy of the full index of all Internet information files cached at said central file server.

31. The arrangement as claimed in claim 30, wherein said reply to said received query by said fifth means is based on the content of said table.

32. The arrangement as claimed in one of claims 18 - 31, wherein said arrangement, for further decreasing the load on said central file server, includes an Updater communicating with said local cache server and with said central file server, wherein said Updater includes:

requesting means for requesting a copy of an Internet information file stored in a local cache server; and

storing means for storing the thereby received copy in a central file server.

33. The arrangement as claimed in claim 32, wherein said requesting means are arranged to request a copy of an information file from its origin server, if a local cache server storing said information file resides behind a firewall.

34. The arrangement as claimed in claim 32 or 33, wherein said Updater is arranged to communicate with said

Feeder for receiving an order to request said copy of said information file.

35. The arrangement as claimed in any one of claims 32 - 34, wherein said Updater includes a list of known uncachable information files, for which files a copy should not be requested.

36. The arrangement as claimed in any one of claims 16 - 35, wherein said Feeder is implemented by a lower end computer and said central file server is implemented by a higher end computer.

37. The arrangement as claimed in any one of claims 32 - 35, wherein said Updater is implemented by a lower end computer and said central file server is implemented by a higher end computer.

38. The arrangement as claimed in claim 37, wherein said Updater and at least one Feeder are implemented by a single lower end computer.

39. An Internet caching system, comprising:

a set of local Internet cache servers, wherein each local cache server is arranged to receive requests from users for Internet information files;

at least one central file server included in a central cache site and storing cached Internet information files; and

feeder means interconnecting said set of local cache servers with said central file server, said feeder means including at least one Feeder, which Feeder comprises means for communicating with at least one local cache server in accordance with a protocol used for communicating between Internet cache servers and means for retrieving Internet information files from said central

file server using data base queries, thereby decreasing the load on said central file server.

40. The system as claimed in claim 39, wherein said feeder means are included in said central cache site.

41. The system as claimed in claims 39 or 40, wherein each of said feeder means includes a plurality of Feeders, each of said Feeder interconnecting a subset of said set of local cache servers with said central file server.

42. The Internet caching system as claimed in any one of claims 39 - 41, wherein said central cache site is arranged to serve a defined set of local cache servers, which set in turn serves a linguistically and culturally homogenous user community.

43. The Internet caching system as claimed in any one of claims 39 - 42, wherein said protocol used is either the Internet Cache Protocol or the Cache Digest.

44. The Internet caching system as claimed in any one of claims 39 - 43, wherein each of said Feeder includes a table with a copy of the full index of all information files cached at said central cache site.

45. The Internet caching system as claimed in any one of claims 39 - 44, wherein said central file server includes cached Internet information files having original host names within a predefined range.

46. The Internet caching system as claimed in any one of claims 39 - 45, further comprising updater means, interconnecting said central file server with at least one local cache server of said set, for retrieving a copy of an Internet information file form its origin server or

from said at least one local cache server and for storing said copy in said central file server.

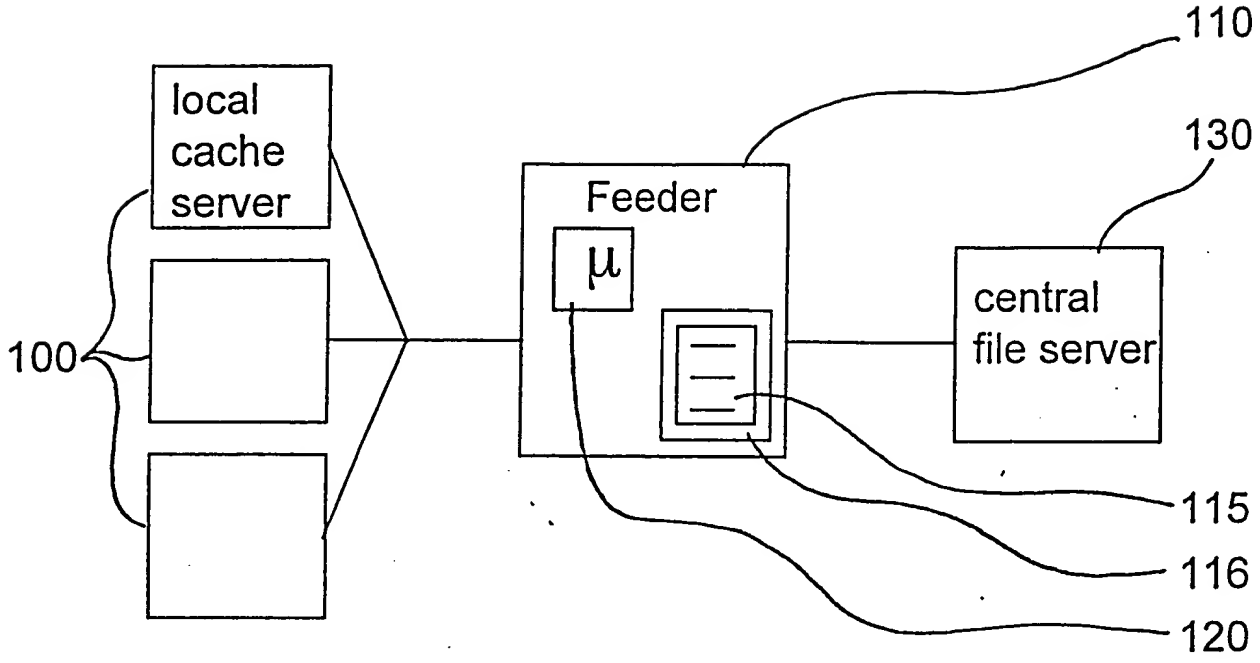
local
cache
server
100
Feeder
μ
central
file server
110
130
115
116
120

FIG. 1

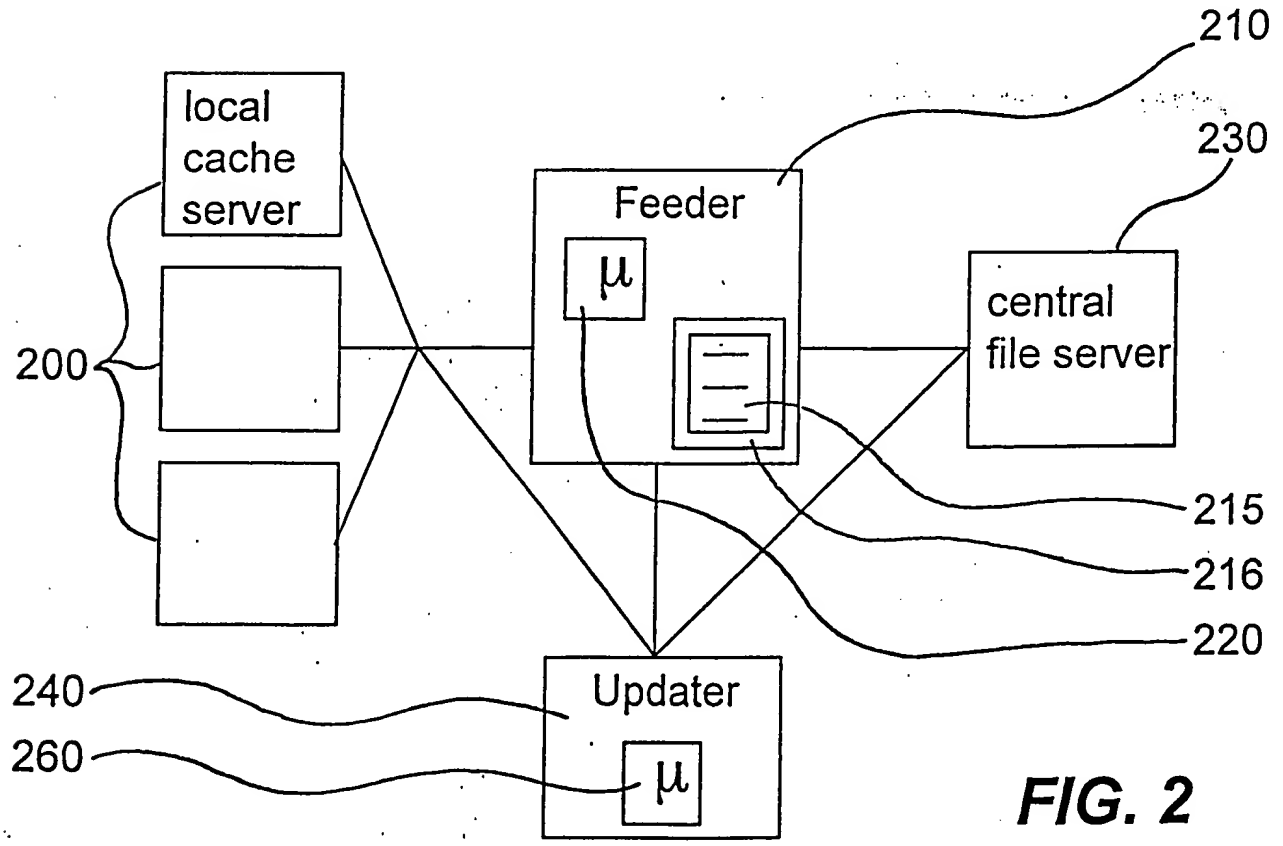
local
cache
server
200
Feeder
μ
central
file server
210
230
215
216
220
240
260
Updater
μ

FIG. 2

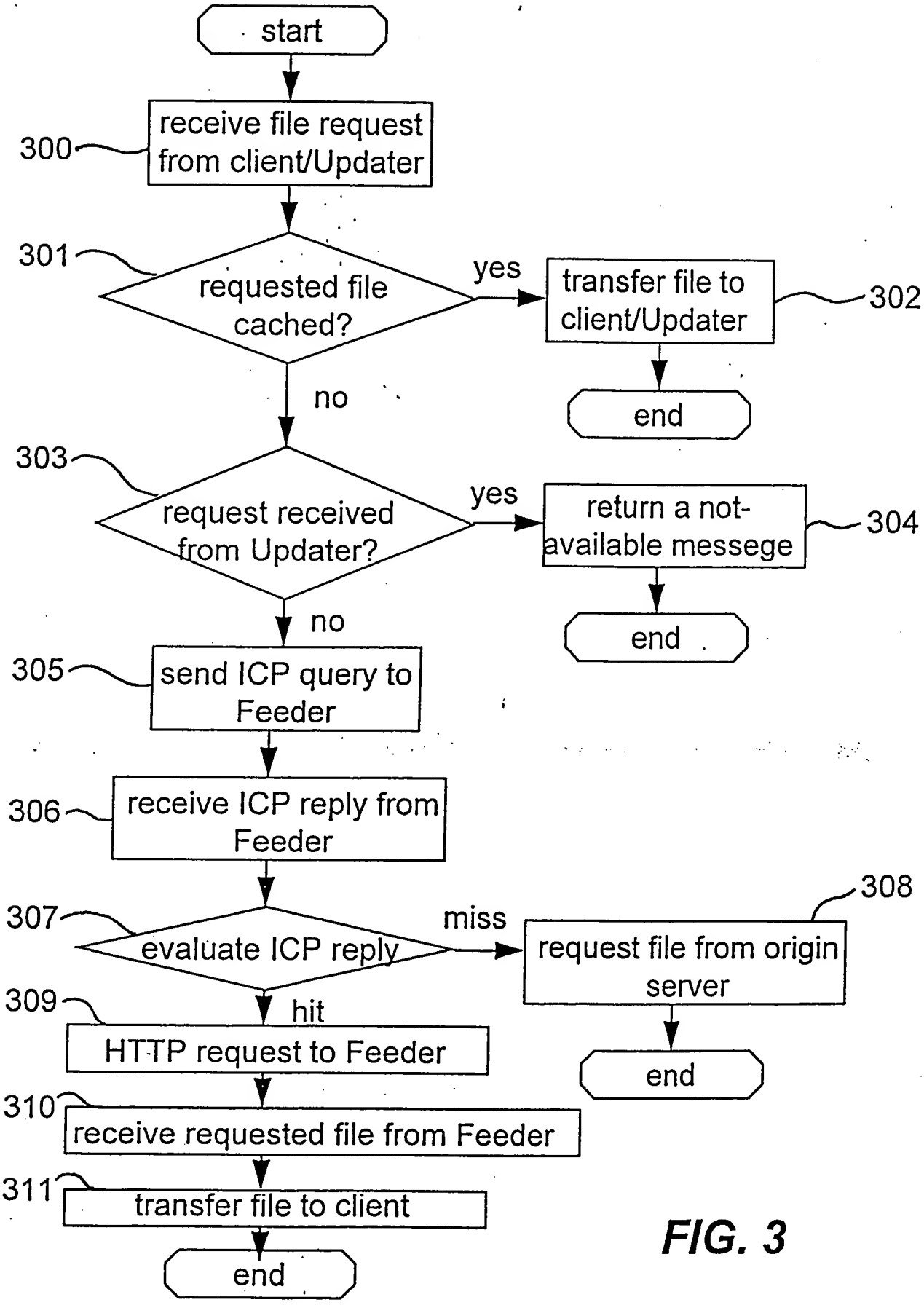
start
receive file request from client/Updater
300
301
requested file cached?
yes
transfer file to client/Updater
302
end
no
303
request received from Updater?
yes
return a not-available messege
304
end
no
305
send ICP query to Feeder
306
receive ICP reply from Feeder
307
evaluate ICP reply
miss
308
request file from origin server
end
hit
309
HTTP request to Feeder
310
receive requested file from Feeder
311
transfer file to client
end

FIG. 3

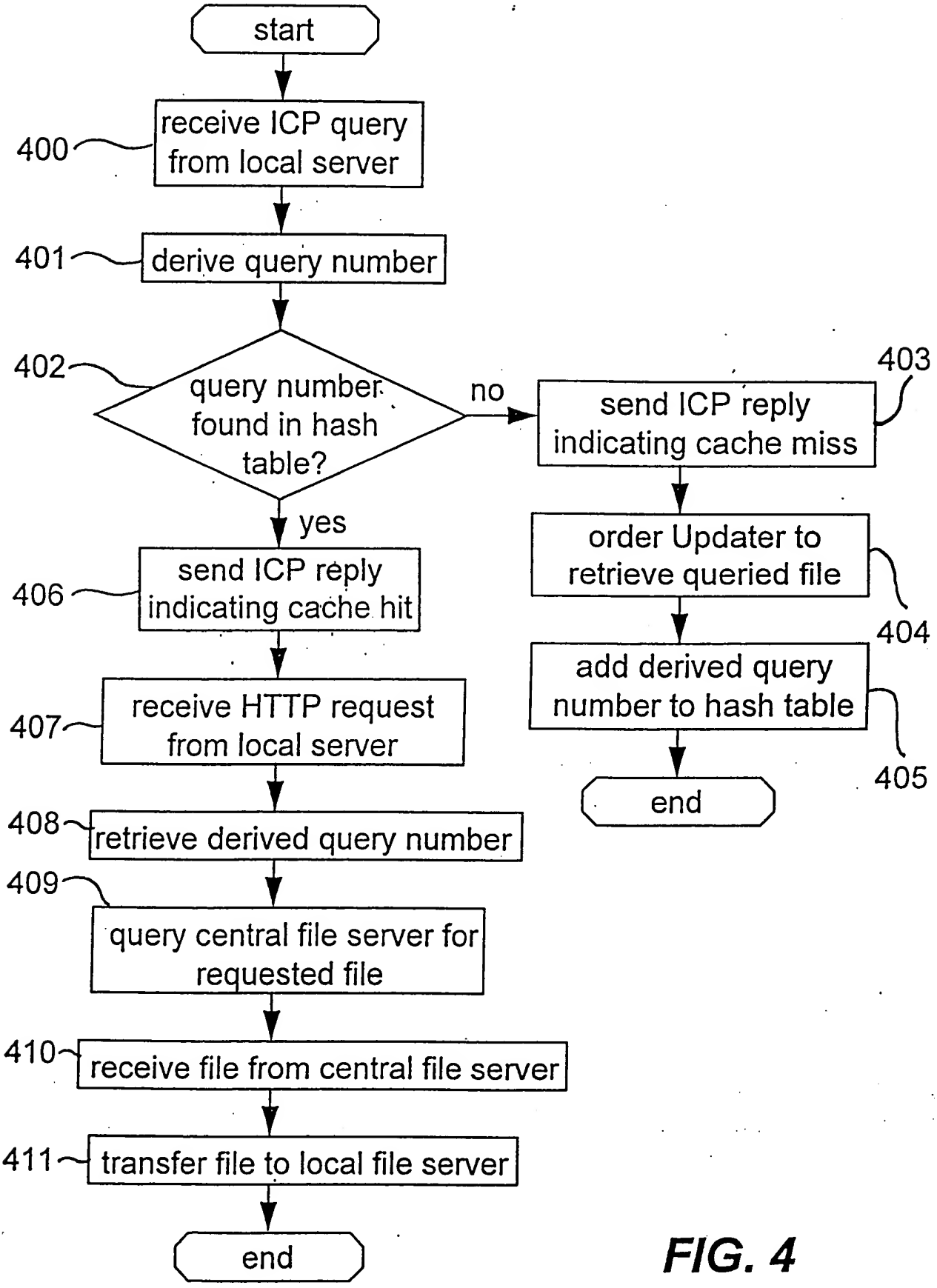
start
400
receive ICP query from local server
401
derive query number
402
query number found in hash table?
no
403
send ICP reply indicating cache miss
order Updater to retrieve queried file
404
add derived query number to hash table
405
end
yes
406
send ICP reply indicating cache hit
407
receive HTTP request from local server
408
retrieve derived query number
409
query central file server for requested file
410
receive file from central file server
411
transfer file to local file server
end

FIG. 4

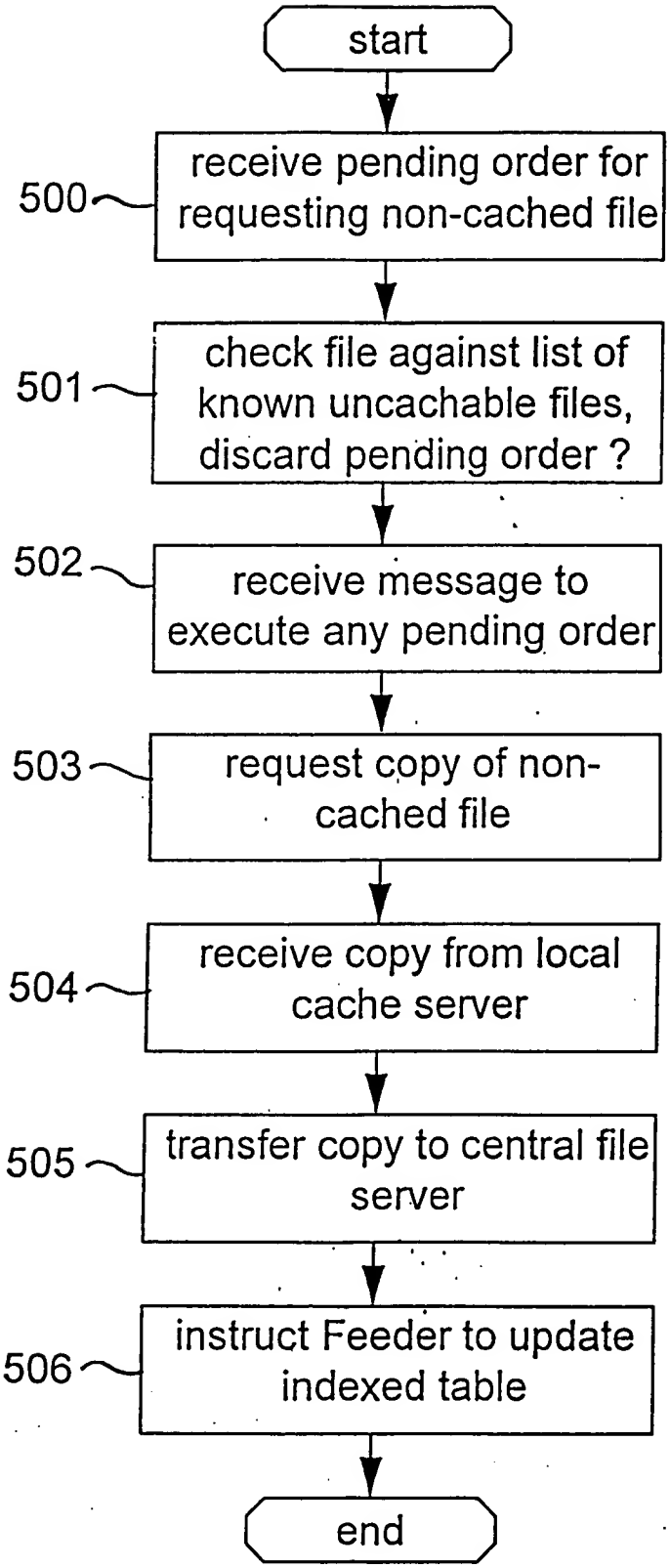
start
500
receive pending order for requesting non-cached file
501
check file against list of known uncachable files, discard pending order ?
502
receive message to execute any pending order
503
request copy of non-cached file
504
receive copy from local cache server
505
transfer copy to central file server
506
instruct Feeder to update indexed table
end

FIG. 5

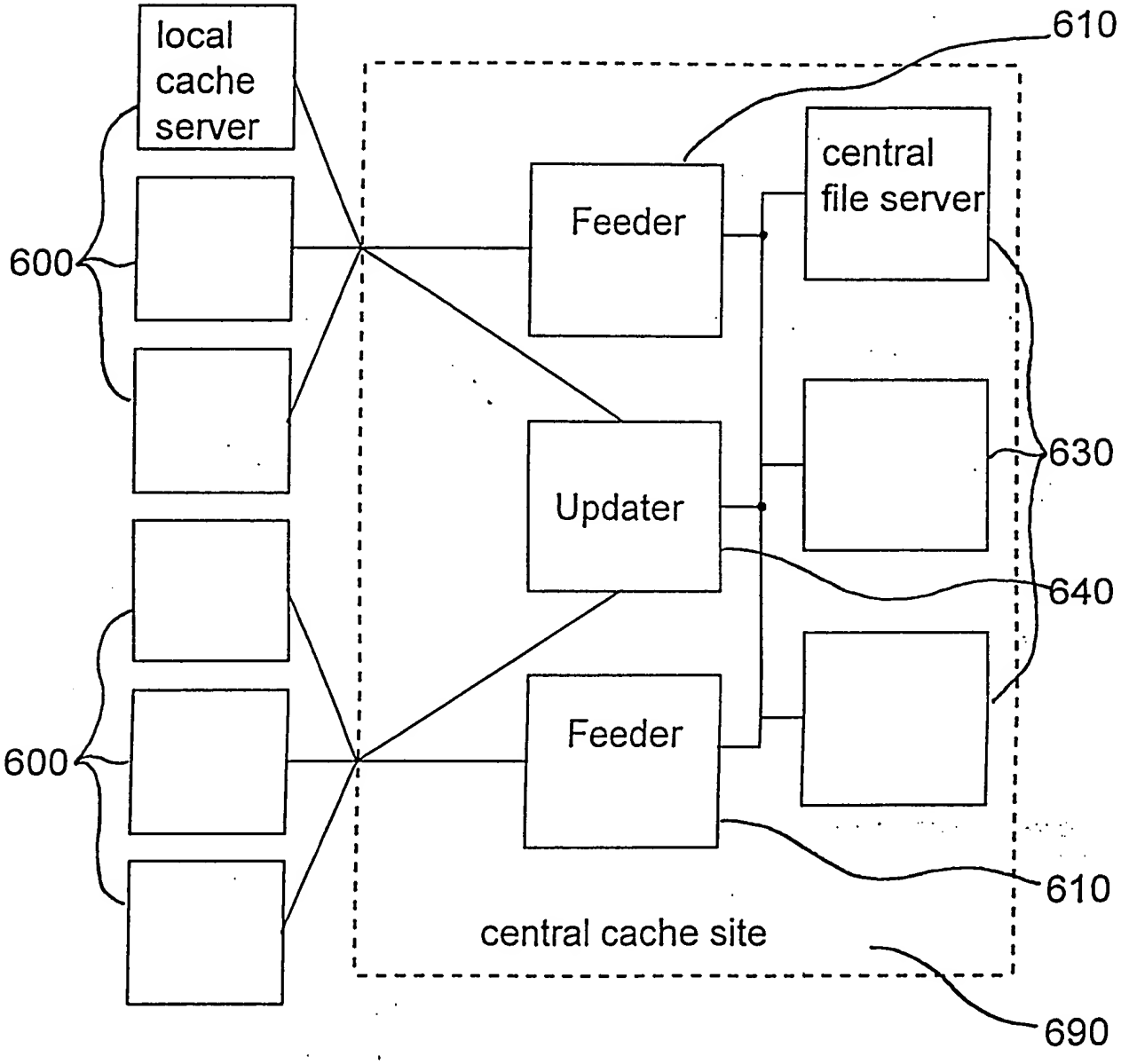
local
cache
server
600
600
Feeder
Updater
Feeder
central
file server
610
630
640
610
central cache site
690

FIG. 6

ATTORNEY DOCKET NO.: 639321.0005 (MIII-103)

ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby acknowledged, I/we the undersigned,

Sverker Lindbo, 40 Elm Street, Wellesley, Massachusetts 02481, USA

(hereinafter, "Assignor"), who, have created a certain invention for which an application for Letters Patent entitled:

AN INTERNET CACHING SYSTEM AND A METHOD
AND AN ARRANGEMENT IN SUCH A SYSTEM

for which the application for Swedish Letters Patent Application No. 9803246-9 has been filed on September 24, 1998.

Do hereby sell, assign and transfer to:

Mirror Image Internet, Inc., 18 Commerce Way, Suite 4800,
Woburn, Massachusetts 01801, USA

(hereinafter, "Assignee"), its successors, assigns, and legal representatives, the full and exclusive right to said invention and said application and to any and all inventions described in said application for the United States, its territorial possessions and all foreign countries, and the entire right, title and interest in and to any and all Letters Patent which may be granted therefor in the United States, its territorial possessions and all foreign countries; and in and to any and all continuations-in-part, continuations, divisions, substitutes, reissues, extensions thereof, and all other applications for Letters Patent relating thereto which have been or shall be filed in the United States, its territorial possessions and/or any foreign countries, and all rights, together with all priority rights, under any of the international conventions, unions, agreements, acts, and treaties, including all future conventions, unions, agreements, acts, and treaties;

We authorize Assignee to apply for and receive Letters Patent for such protection in its own name, in the United States, its territorial possessions, and all foreign countries; and that, when requested to carry out in good faith the intent and purpose of this assignment, at the expense of said Assignee, but without charge to Assignee, its successors, assigns and legal representatives, the undersigned will execute all continuations-in-part, continuations, divisions, substitutes, reissues, and extensions thereof, execute all rightful oaths, assignments, powers of attorney and other papers, testify in any legal or quasi legal proceedings; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said invention and the history thereof; and generally do everything possible which said Assignee, its successors, assigns or legal representatives shall consider desirable for aiding in securing, maintaining and enforcing proper patent protection for said invention and for vesting title to said invention and all applications for patents on said invention in said Assignee, its successors, assigns and legal representatives; and

Covenant with said Assignee, its successors, assigns and legal representatives that no assignment, grant, mortgage, license or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

IN TESTIMONY WHEREOF, we have hereunto set our signatures below.

Signature of Assignor: _____
Sverker Lindbo

NOTORIAL CERTIFICATE

State of Massachusetts County of Norfolk

On this 4th day of November, 1999, personally appeared Sverker Lindbo, to me known, the assignor above named, and executed the foregoing Assignment and who, having been duly sworn, stated that any representations therein contained are true.

Notary Public _____ SEAL

Joseph D. Carlo, Notary Public
My Commission Expires May 1, 2003

Signature of Assignee: _____
Timo Aittola

NOTORIAL CERTIFICATE

State of Massachusetts County of Norfolk

On this 4th day of November, 1999, personally appeared Timo Aittola, to me known and known to me to be Treasurer of Mirror Image Internet, Inc., the assignee above named, and acknowledged that he executed the foregoing Assignment on behalf of said assignee and pursuant to authority duly received, and who, having been duly sworn, stated that any representations therein contained are true.

Notary Public _____ SEAL

Joseph D. Carlo, Notary Public
My Commission Expires May 1, 2003

639321.0005 (MIII-103) PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit:
		)	
Serial No.:	09/445,845	)	Examiner:
		)	
Filing Date:	December 14, 1999	)	

Title: **INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Assistant Commissioner for Patents
Washington, DC 20231

CERTIFICATE OF EXPRESS MAILING

I hereby certify that this correspondence includes the following:

- Statement of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b);
- Check No. 117069 for $130.00;
- Statement under 37 C.F.R. §373(b) Establishing Proprietary Interest by Person Signing on Behalf of Nonsigning Inventor;
- Combined Declaration Under 37 C.F.R. §1.63 and Oath/Power of Attorney; and
- Return post card,

and certify that this correspondence is being deposited with the United States Postal Service "Express Mail to Addressee" Service under C.F.R. §1.10 on the date shown below with sufficient postage, and is addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on:

Date of Deposit: September 8, 2000

Express Mailing Label No. EL246473121US.

Beth L. Parmelee

EL246473121US

.StmLib1:835533.1 09/08/00

639321.0005 (MIII-103)

PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit:
		)	
Serial No.:	09/445,845	)	Examiner:
		)	
Filing Date:	December 14, 1999	)	

Title: **INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Commissioner for Patents
Washington, DC 20231

STATEMENT OF FACTS IN SUPPORT OF FILING ON BEHALF OF NONSIGNING INVENTOR PURSUANT TO 37 C.F.R. §1.47(b)

Dear Sir:

This statement is made as to the exact facts that are relied upon to establish the diligent effort made to secure the execution of the declaration by the nonsigning sole inventor for the above-identified patent application after deposit thereof in the Patent and Trademark Office. Because the sole inventor, Mr. Lindbo, would not sign, the signing on behalf of the nonsigning inventor is by an entity showing a sufficient proprietary interest. This statement also recites facts as to why this action was necessary to preserve the rights of the parties and to prevent irreparable damage.

This statement is being made by the available person having first-hand knowledge of the facts recited herein.

The last known address of the inventor, Sverker Lindbo, is 40 Elm Street, Wellesley, Massachusetts 02481.

Our bona fide attempt at acquiring the inventor's signature consisted of providing Mr. Lindbo, the inventor, with a copy of the application and associated Oath/Declaration.

CERTIFICATE OF MAILING/TRANSMISSION

I hereby certify that this correspondence, is, on the date shown below, being:

MAILING

☐ deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, DC 20231.

☒ deposited with the United States Postal Service with sufficient postage as Express Mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, DC 20231.
EXPRESS MAIL #EL246473121US

FACSIMILE

☐ transmitted by facsimile to the Patent and Trademark Office.

DATE: September 8, 2000

Beth L. Parmelee

We received no response from Mr. Lindbo. Mr. Lindbo expressly refused to sign in writing as evidenced by the attached letter from his lawyer Mark Shub dated March 22, 2000. Further, we requested Timo Aittola, who has a personal and professional relationship with Mr. Lindbo, additionally request signature by Mr. Lindbo. At such time, Mr. Lindbo corresponded with me directly via e-mail. The attached e-mail dated May 5, 2000, from Mr. Lindbo to myself, demonstrates his refusal to sign. To summarize Mr. Lindbo's point of view, he feels Mirror Image Internet, Inc, has breached their employment arrangement, therefore Mirror Image Internet, Inc. is not the rightful owner under such circumstances. As a result, Mr. Lindbo feels compelled to refuse signature of any legal documents.

A check for $130.00 to cover the fee under 37 C.F.R. § 1.17(i) is enclosed. The Commissioner is authorized to charge any additional fees associated with the submission of these formal papers to Deposit Account No. 11-0231. **A duplicate copy of this sheet is enclosed.**

Respectfully submitted,

Dated: September 8, 2000

George Chaclas

George N. Chaclas, Reg. No. P-46,608
Attorney for Applicant
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.StmLib1:825790.1 09/08/00

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March 22, 2000

VIA FAX: (203) 708-4534

Theresa D. Recupido, Esq.
Cummings and Lockwood
4 Stamford Plaza
PO Box 120
Stamford, CT 06904-0120

RE: Declaration, Power of Attorney and Petition

Dear Ms. Recupido:

Please be advised that this office represents Sverker Lindbo. Mr. Lindbo contacted me regarding a Declaration, Power of Attorney and Petition that you recently sent to him. You have supplied no information as to who you represent or why you are requesting that Mr. Lindbo execute these documents. Without further information regarding this matter, Mr. Lindbo will not sign any of these documents.

You may contact this office if there are any further questions in this matter.

Very truly yours,

Mark G. Shub

MGS/ss
cc: Sverker Lindbo (*via e-mail*)

Express Mail Label No. EL246473121US

Express Mail Label No. EL246473121US

George Chaclas - Patent paperwork

From: Sverker Lindbo <slindbo@itechventures.com>
To: <gchacl@cl-law.com>
Date: 5/5/00 5:22 PM
Subject: Patent paperwork
CC: <santullo@mirror-image.com>

Dear Mr Chaclas,

Some days ago I did receive two batches of patent documentation for my signature. I immediately sent an e-mail to mr Aittola to enquire whether he was reado to honor the agreements whereby the patents were orignally acquired from the previous owner, Mirror Image Internet AB, and a subsequent agreement regarding our participation in procuring the signature of one of the co-inventors.

It is my uinderstanding that Mr Aittola was not ready to honor those agreements, which in my view, puts the eintire ownership of the patents into question. I therefore sent the followning message to Mr Aittola earlier today.

I trust you will do what it takes from your end to ensure that no intellectual property value is being irrevocably lost while this matter is being resolved. I am ready to cooperate with any acceptable escrow agent, should that be the preferred option.

Yours sincerely,

Sverker Lindbo

PS to Mr Santullo,

I hate to make the first contact between us in this fashion, but I do believe that the patent issue has been grossly mismanaged by Mr AIttola and Cuummins and Lockwood, and I fear that important deadlines may be missed. As the innovator, I would hate to see that happen. My fiduciary duty as a board member of Parfi Holding AB, which is a mjor shareholder of Mirror Image Internet Inc, however precludes me from just signing these documents until the ownership and payment issues are fully resolved. Should you wish to talk to me about this or any other issue regarding Mirror Image and its ownership, please call me at any time, preferrably on my cellphone (listed below)

Dear Mr Aittola,

I understand from the correspondence you have sent me that you do not appear to be intending to honor the agreements whereby the patents were acquired from Mirror Image Internet AB. Additionally you do not appear to be intending to honor the subsequent agreements under which, among other things, I personally helped you procure the signature of my friend Peter Löthberg.

If the above is truly your position, Parfi Holding AB or Drax Holding AB whichever party is better positioned, will see no other option, than to challenge your ownership of the patents in the Swedish legal system. Until such matter is resolved, I will not sign any documents in favor of Mirror Image Intenet Inc, in relation to these patents.

Should there be instances where my signature is required to prevent irrevocable loss of any intellectual property value, I propose the you have the patents transferred to an escrow agent, acceptable to both parties. I will be willing to sign all relevant documents in favor of such an escrow agent.

Should you want to settle this issue quickly, I propose that you contact Mr Hane. He is currently on business in London but will be back in the office on Monday. He can also be reached today on the cellphone of Mr Anders Janson, +46 705 63 02 90

Best regards,

Sverker Lindbo
****
****
Sverker
Lindbo
President
http://www.itechventures.com
Internet Technology Ventures, LLC
70 Walnut Street, Wellesley, MA 02481-2175
phone: (781) 239-8132
fax: (603)971 9365
US cellular: (781) 608-9677
5625

fax:+468 5981 8523

mailto:slindbo@itechventures.com

US

GSM mobile: +4670 886

Swedish

639321.0005 (MIII-103)

PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	LINDBO	)	Art Unit:
		)	
Serial No.:	09/445,845	)	Examiner:
		)	
Filing Date:	December 14, 1999	)	

Title: **INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Commissioner for Patents
Washington, DC 20231

STATEMENT UNDER 37 C.F.R. §373(b) ESTABLISHING PROPRIETARY INTEREST BY PERSON SIGNING ON BEHALF OF NONSIGNING INVENTOR

Dear Sir:

I, Timo Aittola, residing at 244 Shelter Rock Road, Stamford, Connecticut, 06903, am the person signing the declaration on the above-identified application on behalf of the nonsigning inventor and make this statement as to the facts establishing my proprietary interest. The above-identified application was described and claimed in PCT Application No. PCT/US99/21248 which was based upon Swedish Patent Application No. 9803246-9.

As of the date I signed the Combined Declaration under 37 C.F.R. §1.63 and OATH/Power of Attorney for this application, the proprietary interest in this invention belonged to the following entity:

Mirror Image Internet Inc.
49 Dragon Court
Woburn, MA 01801

As Chief Financial Officer of Mirror Image Internet Inc., I am authorized to sign the statement on behalf of Mirror Image Internet Inc.

I establish the proprietary interest by attaching a copy of the assignment of this invention from the nonsigning inventor, Mr. Lindbo, to Mirror Image Internet Inc., the assignee.

Express Mail Label No. EL246473121US

In accordance with 37 CFR 3.73(b), the assignee hereby states that the evidentiary documents with respect to its ownership have been reviewed and that, to the best of assignee's knowledge and belief, title is in the assignee seeking to take this action.

Respectfully submitted,

Dated: 09/01/00

Timo Aittola
Chief Financial Officer
Mirror Image Internet Inc.
49 Dragon Court
Woburn, MA 01801

.StmLib1:825794.1 08/07/00

ATTORNEY DOCKET NO.: 639321.0005 (MIII-103)

ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby acknowledged, I/we the undersigned,

Sverker Lindbo, 40 Elm Street, Wellesley, Massachusetts 02481, USA

(hereinafter, "Assignor"), who, have created a certain invention for which an application for Letters Patent entitled:

AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM

for which the application for Swedish Letters Patent Application No. 9803246-9 has been filed on September 24, 1998.

Do hereby sell, assign and transfer to:

Mirror Image Internet, Inc., 18 Commerce Way, Suite 4800, Woburn, Massachusetts 01801, USA

(hereinafter, "Assignee"), its successors, assigns, and legal representatives, the full and exclusive right to said invention and said application and to any and all inventions described in said application for the United States, its territorial possessions and all foreign countries, and the entire right, title and interest in and to any and all Letters Patent which may be granted therefor in the United States, its territorial possessions and all foreign countries; and in and to any and all continuations-in-part, continuations, divisions, substitutes, reissues, extensions thereof, and all other applications for Letters Patent relating thereto which have been or shall be filed in the United States, its territorial possessions and/or any foreign countries, and all rights, together with all priority rights, under any of the international conventions, unions, agreements, acts, and treaties, including all future conventions, unions, agreements, acts, and treaties;

We authorize Assignee to apply for and receive Letters Patent for such protection in its own name, in the United States, its territorial possessions, and all foreign countries; and that, when requested to carry out in good faith the intent and purpose of this assignment, at the expense of said Assignee, but without charge to Assignee, its successors, assigns and legal representatives, the undersigned will execute all continuations-in-part, continuations, divisions, substitutes, reissues, and extensions thereof, execute all rightful oaths, assignments, powers of attorney and other papers, testify in any legal or quasi legal proceedings; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said invention and the history thereof; and generally do everything possible which said Assignee, its successors, assigns or legal representatives shall consider desirable for aiding in securing, maintaining and enforcing proper patent protection for said invention and for vesting title to said invention and all applications for patents on said invention in said Assignee, its successors, assigns and legal representatives; and

Covenant with said Assignee, its successors, assigns and legal representatives that no assignment, grant, mortgage, license or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

IN TESTIMONY WHEREOF, we have hereunto set our signatures below.

Signature of Assignor: _____
Sverker Lindbo

NOTORIAL CERTIFICATE

State of Massachusetts County of Norfolk

On this 9th day of November, 1999, personally appeared Sverker Lindbo, to me known, the assignor above named, and executed the foregoing Assignment and who, having been duly sworn, stated that any representations therein contained are true.

Notary Public _____ SEAL

Joseph D. Carlo, Notary Public
My Commission Expires May 1, 2003

Signature of Assignee: _____
Timo Aittola

NOTORIAL CERTIFICATE

State of Massachusetts County of Norfolk

On this 4th day of November, 1999, personally appeared Timo Aittola, to me known and known to me to be Treasurer of Mirror Image Internet, Inc., the assignee above named, and acknowledged that he executed the foregoing Assignment on behalf of said assignee and pursuant to authority duly received, and who, having been duly sworn, stated that any representations therein contained are true.

Notary Public _____ SEAL

Joseph D. Carlo, Notary Public
My Commission Expires May 1, 2003

639321.0005 (MIII-103) PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	LINDBO	)	Art Unit:
		)	
Serial No.:	09/445,845	)	Examiner:
		)	
Filing Date:	December 14, 1999	)	

Title: **INTERNET CACHING SYSTEM AND A MEHTOD AND AN ARRANGEMENT IN SUCH A SYSTEM**

Commissioner for Patents
Washington, DC 20231

COMBINED DECLARATION UNDER 37 C.F.R. §1.63 AND OATH/POWER OF ATTORNEY

Dear Sir:

I, Timo Aittola, hereby declare that Mirror Image Internet, Inc., is a company incorporated under the laws of the State of Delaware, with an office at 49 Dragon Court, Woburn, Massachusetts 01801. As Chief Financial Officer of Mirror Image Internet Inc., I am an authorized representative of Mirror Image Internet, Inc., which company has sufficient proprietary interest to act as an agent, pursuant to 37 C.F.R. §1.47(b), on behalf of Mr. Lindbo, a nonsigning inventor, who refuses to sign a Declaration/Power of Attorney in the above-identified patent application.

By virtue of this proprietary interest, I sign this declaration on behalf of, and as agent for Sverker Lindbo, who, as inventor, has refused to sign the Declaration/Power of Attorney. Sverker Lindbo is a Swedish citizen, whose last known address is 40 Elm Street, Wellesley, Massachusetts 02481. Upon information and belief, I aver that the inventor is required to execute the Declaration under 37 CFR 1.64(b). My signing is necessary on behalf of Mr. Lindbo to prevent abandonment of the application and the loss of rights associated therewith.

Accompanying this combined declaration, to establish the proof of pertinent facts and to show that such action is necessary to preserve the rights of the parties and to prevent irreparable damage, is a Statement of Facts in Support of Filing on Behalf of

Nonsigning Inventor Pursuant to 37 C.F.R. §1.47(b), a Statement under 37 C.F.R. §373(b) Establishing Proprietary Interest by Person Signing on Behalf of a Nonsigning Inventor and a check for $130.00 to cover the petition fee under 37 C.F.R. §1.17(i).

Further, I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as filed and as amended by the preliminary amendment filed with the specification, and that it contains a full, clear, concise and exact description of the subject matter for which a patent is sought.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. §1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. §119 of Swedish Patent Application No. 9803246-9 filed September 24, 1998, which was the basis for PCT Application No. PCT/US99/21248 of which the subject application is a national phase application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint:

Mark Giarratana, Reg. No. 32,615
James W. Jakobsen, Reg. No. 38,505
Barry Kramer, Reg. No. 20,622
George N. Chaclas Reg. No. P-46,608
David W. Poirier, Reg. No. 43,007
Robert Rispoli, Reg. No. 43,884
Steven J. Moore, Reg. No. 35,959
Basam E. Nabulsi, Reg. No. 31,645
R. Thomas Payne, Reg. No. 30,674
Scott D. Wofsy, Reg. No. 35,413
Eric Parham, Reg. No. 45,747
Eric Grondahl, Reg. No. P-46,741

of the firm of CUMMINGS & LOCKWOOD, whose address is Four Stamford Plaza, P.O. Box 120, Stamford, Connecticut 06904-0120, as our attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Please address all written correspondence to the following address:

CUMMINGS & LOCKWOOD

Att: Anita Lomartra

P.O. Box 1960

New Haven, CT 06509-9958

Telephone Calls should be directed to George N. Chaclas by dialing (203) 351-4103.

Wherefor I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, declaration, power of attorney, and this petition.

Respectfully submitted,

Dated: 09/01/00

Timo Aittola
Chief Financial Officer
Mirror Image Internet Inc.
49 Dragon Court
Woburn, Massachusetts 01801

.StmLib1:825798.1 07/19/00

ATTORNEY DOCKET NO.: 639321.0005 (MIII-103)

ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby acknowledged, I/we the undersigned,

Sverker Lindbo, 40 Elm Street, Wellesley, Massachusetts 02481, USA

(hereinafter, "Assignor"), who, have created a certain invention for which an application for Letters Patent entitled:

AN INTERNET CACHING SYSTEM AND A METHOD
AND AN ARRANGEMENT IN SUCH A SYSTEM

for which the application for Swedish Letters Patent Application No. 9803246-9 has been filed on September 24, 1998.

Do hereby sell, assign and transfer to:

Mirror Image Internet, Inc., 18 Commerce Way, Suite 4800,
Woburn, Massachusetts 01801, USA

(hereinafter, "Assignee"), its successors, assigns, and legal representatives, the full and exclusive right to said invention and said application and to any and all inventions described in said application for the United States, its territorial possessions and all foreign countries, and the entire right, title and interest in and to any and all Letters Patent which may be granted therefor in the United States, its territorial possessions and all foreign countries; and in and to any and all continuations-in-part, continuations, divisions, substitutes, reissues, extensions thereof, and all other applications for Letters Patent relating thereto which have been or shall be filed in the United States, its territorial possessions and/or any foreign countries, and all rights, together with all priority rights, under any of the international conventions, unions, agreements, acts, and treaties, including all future conventions, unions, agreements, acts, and treaties;

We authorize Assignee to apply for and receive Letters Patent for such protection in its own name, in the United States, its territorial possessions, and all foreign countries; and that, when requested to carry out in good faith the intent and purpose of this assignment, at the expense of said Assignee, but without charge to Assignee, its successors, assigns and legal representatives, the undersigned will execute all continuations-in-part, continuations, divisions, substitutes, reissues, and extensions thereof, execute all rightful oaths, assignments, powers of attorney and other papers, testify in any legal or quasi legal proceedings; communicate to said Assignee, its successors, assigns, and legal representatives all facts known to the undersigned relating to said invention and the history thereof; and generally do everything possible which said Assignee, its successors, assigns or legal representatives shall consider desirable for aiding in securing, maintaining and enforcing proper patent protection for said invention and for vesting title to said invention and all applications for patents on said invention in said Assignee, its successors, assigns and legal representatives; and

Covenant with said Assignee, its successors, assigns and legal representatives that no assignment, grant, mortgage, license or other agreement affecting the rights and property herein conveyed has been made to others by the undersigned, and that full right to convey the same as herein expressed is possessed by the undersigned.

IN TESTIMONY WHEREOF, we have hereunto set our signatures below.

Signature of Assignor: _____
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NOTORIAL CERTIFICATE

State of Massachusetts County of Norfolk

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Notary Public _____ SEAL

Joseph D. Carlo, Notary Public
My Commission Expires May 1, 2003

Signature of Assignee: _____
Timo Aittola

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uth a

George Chaclas - Patent paperwork

From: Sverker Lindbo <slindbo@itechventures.com>
To: <gchacl@cl-law.com>
Date: 5/5/00 5:22 PM
Subject: Patent paperwork
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Yours sincerely,

Sverker Lindbo

PS to Mr Santullo,

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Should there be instances where my signature is required to prevent irrevocable loss of any intellectual property value, I propose the you have the patents transferred to an escrow agent, acceptable to both parties. I will be willing to sign all relevant documents in favor of such an escrow agent.

Should you want to settle this issue quickly, I propose that you contact Mr Hane. He is currently on business in London but will be back in the office on Monday. He can also be reached today on the cellphone of Mr Anders Janson, +46 705 63 02 90

Best regards,

Sverker Lindbo
****
****

Sverker
Lindbo
President
http://www.itechventures.com
Internet Technology Ventures, LLC
70 Walnut Street, Wellesley, MA 02481-2175
phone: (781) 239-8132
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fax:+468 5981 8523

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US

GSM mobile: +4670 886

Swedish

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
Washington, D.C. 20231
www.uspto.gov

R. Thomas Payne
CUMMINGS & LOCKWOOD
Four Stamford Plaza
Stamford, CT 06904

In re Application of :
LINDBO, Sverker :
U.S. Application No.: 09/445,845 :
PCT No.: PCT/US99/21248 :
Int. Filing Date: 22 September 1999 : DECISION
Priority Date: 24 September 1998 :
Attorney's Docket No.: 639321.0005 :
For: AN INTERNET CACHING SYSTEM :
AND A METHOD AND AN :
ARRANGEMENT IN SUCH A SYSTEM :

The decision is in response to applicant's petition under 37 CFR 1.47(b) submitted on 08 September 2000 requesting that the United States Patent and Trademark Office accept a declaration without the signature of the sole inventor.

BACKGROUND

On 22 September 1999, applicant filed the above-captioned international application claiming priority to a Swedish patent application filed 24 September 1998. No Demand was filed electing the United States prior to the expiration of 19 months from the priority date. Accordingly, the twenty-month period for entering the national stage expired on 24 May 2000.

On 14 December 1999, applicant filed a transmittal letter for entry into the national stage in the United States under 35 U.S.C. 371 which was accompanied by, *inter alia*, an unexecuted declaration, a check in the amount of $1,138.00 for the petition fee and additional claims, and authorization to charge Counsel's Deposit Account 11-0231 for any additional fees which may be required.

On 08 September 2000, applicant submitted the following papers: a "Combined Declaration Under 37 C.F.R. § 1.63 and Oath/Power of Attorney"; a "Statement Under 37 C.F.R. §373(b) Establishing Proprietary Interest by Person Signing on Behalf of Nonsigning Inventor"; a "Statement of Facts in Support of Filing on Behalf of Nonsigning Inventor Pursuant to 37 CFR § 1.47" ("Chaclas Decl."); a copy of two pages of e-mail dated 05 May 2000; a copy of a letter dated 22 March 2000; and a copy of an assignment ("Assign.") dated 09 November 1999 for the above-identified invention.

DISCUSSION

A petition under 37 CFR 1.47(b) must be accompanied by (1) the requisite petition fee, (2) factual proof that the inventor refuses to execute the application, (3) a statement of the last known address of the inventor, (4) an oath or declaration by the 37 CFR 1.47(b) applicant on behalf of and as agent for the non-signing inventor, (5) proof that the 37 CFR 1.47(b) applicant has sufficient proprietary interest in the application, and (6) a showing that such action is necessary to preserve the rights of the parties or to prevent irreparable damage. Applicant failed to satisfy items (2) and (4).

Applicant has submitted the petition fee of $130.00. Item (1) has been satisfied.

With regard to item (3), the 37 CFR 1.47(b) applicant states that the last known address of the sole inventor is 40 Elm Street, Wellesley, Massachusetts 02481. Item (3) has been satisfied.

Regarding item (5), section 409.03(f) of the MPEP states, in part:

> If the application has been assigned, a copy of the assignment (in the English language) must be submitted. The assignment must clearly indicate that the invention described in the 37 CFR 1.47(b) application was assigned to the 37 CFR 1.47(b) applicant prior to the date the application is deposited in the Patent and Trademark Office. A statement under 37 CFR 3.73(b) by the assignee must also be submitted (see MPEP Section 324).

In this case, applicant has submitted a copy of an assignment dated 09 November 1999 and a "Statement Under 37 C.F.R. §373(b) Establishing Proprietary Interest by Person Signing on Behalf of Nonsigning Inventor" executed by Mr. Aittola. The assignment is signed by the sole inventor, Sverker Lindbo, who assigned and transferred the entire right, title and interest in the invention titled an "Internet Caching System and a Method and an Arrangement in Such a System" for Swedish patent application number 9803246-9 to the 37 CFR 1.47(b) applicant, Mirror Image Internet, Inc, its successors, assigns, and legal representatives, the full and exclusive right to this invention and to any and all inventions described in the patent application for the United States, its territorial possessions and all foreign countries. This evidence is sufficient to prove that the 37 CFR 1.47(b) has sufficient proprietary interest in the above-captioned application to satisfy item (5).

Concerning item (6), section 409.03(g) of the MPEP states that "irreparable damage may be established by showing that a filing date is necessary to (A) avoid an imminent statutory bar (35 U.S.C. 102) or (B) make a claim for priority (35 U.S.C. 119, 120, and 121)."

Here, irreparable damage appears to be alleged via the claim that "[t]his statement also recites facts as to why this action was necessary to preserve the rights of the parties and to prevent irreparable damage." Chaclas Decl. ¶ 1. No such facts were expressed in Mr. Chaclas' statement. Further, a review of the e-mail submitted references "important deadlines that may be missed," but does not clarify what these deadlines are. Nevertheless, in paragraph two of the "Combined Declaration Under 37 C.F.R. § 1.63 and Oath/Power of Attorney," the 37 CFR 1.47(b) declares that "[m]y signing is necessary on behalf of Mr. Lindbo to prevent abandonment of the application and loss of rights associated therewith." This statement is sufficient to meet the requirements of Item (6).

However, regarding item (2), section 409.03(d) discusses the proof required to prove a refusal by an inventor and states, in part:

> When it is concluded by the 37 CFR 1.47 applicant that a non-signing inventor's conduct constitutes a refusal, all facts upon which that conclusion is based should be stated in an affidavit or declaration. If there is documentary evidence to support facts alleged in the affidavit or declaration, such evidence should be submitted. Whenever a non-signing inventor gives a reason for refusing to sign the application oath or declaration, that reason should be stated in the affidavit or declaration.

In this case, applicant states that after sending a copy of the application to the inventor, "Mr. Lindbo expressly refused to sign in writing as evidenced by the attached letter from his lawyer Mark Shub dated March 22, 2000. Further, we requested Timo Aittola, who has a personal and professional relationship with Mr. Lindbo, additionally request signature *[sic]* by Mr. Lindbo. At such time, Mr. Lindbo corresponded with me directly via e-mail. The attached e-mail dated May 5, 2000, from Mr. Lindbo to myself, demonstrates his refusal to sign." Chaclas Decl. ¶ 5.

Petitioner has not provided adequate proof that the sole inventor refuses to sign the application. A copy of a letter from Mr. Lindbo's attorney, Mark Shub, to Cummings and Lockwood dated 22 March 2000 is attached. In the letter, counsel explains that Cummings and Lockwood "have supplied no information as to who you represent or why you are requesting that Mr. Lindbo execute these documents. Without further information regarding this matter, Mr. Lindbo will not sign any of these documents." This is not an express refusal. Moreover, applicant needs to explain why Mr. Shub claims that the inventor is unaware of the identity of the entity requesting his signature. Furthermore, Mr. Lindbo's states in the 05 May 2000 e-mail to Mr. Aittola that:

> Until such matter is resolved, I will not sign any documents in favor of Mirror Image Internet, Inc. in relation to these patents.
>
> Should there be instances where my signature is required to

> prevent irrevocable loss of any intellectual property value, I propose that you have the patents transferred to an escrow agent, acceptable to both parties. **I will be willing to sign** all relevant documents in favor of such an escrow agent. [Emphasis added.]

Clearly, this is not an express refusal to sign. In addition, section 409.03(d) of the Manual of Patent Examining Procedure (MPEP) adds another requirement to proving a refusal and states, in part that:

> Before a refusal can be alleged, it must be demonstrated that a bona fide attempt was made to present a copy of the application papers (specification, including claims, drawings, and oath or declaration) to the non-signing inventor for signature.

In this case, applicant states that "[o]ur bona fide attempt at acquiring the inventor's signature consisted of providing Mr. Lindbo, the inventor, with a copy of the application and associated Oath/Declaration." Chaclas Decl. ¶ 4. In the e-mail dated 05 May 2000, Mr. Lindbo admits that he "receive[ed] two batches of patent documentation for my signature." Nonetheless, these statements are not sufficient to prove that the inventor was presented a complete copy of all of the application papers as required. For the reasons discussed above, item (2) is not satisfied.

Moreover, concerning item (4), applicant has submitted a Combined Declaration and Power of Attorney signed by Timo Aittola, Chief Financial Officer of Mirror Image Internet Inc. who states that he is "an authorized representative of Mirror Image Internet, Inc." Section 324 of the MPEP states that "[t]he submission may be signed by any person, if the submission includes an averment that the person is empowered to sign the submission on behalf of the assignee. Mr. Aittola's declaration is sufficient to meet the requirement of section 324, however, the declaration itself fails to comply with 37 CFR 1.497 and 1.63. Specifically, it does not include the statements required under 37 CFR 1.497(a)(4) and 1.63(a)(4). In addition, the declaration does not list Mr. Aittola's citizenship, residence, and post office address as required by 37 CFR 1.497(b). Thus, item (4) is also not satisfied.

Accordingly, since applicants failed to meet item(s) (2) and (4), it is not appropriate to accept this application under 37 CFR 1.47(a) at this time.

CONCLUSION

The petition under 37 CFR 1.47(b) is **DISMISSED** without prejudice.

If reconsideration on the merits of this petition is desired, a proper response

must be filed within **TWO (2) MONTHS** from the mail date of this decision. Any reconsideration request should include a cover letter entitled "Renewed Petition Under 37 CFR 1.47(b)." No additional petition fee is required.

Any further correspondence with respect to this matter should be addressed to the Assistant Commissioner for Patents, Box PCT, Washington, D.C. 20231, with the contents of the letter marked to the attention of the PCT Legal Office.

Richard Cole
PCT Legal Examiner
PCT Legal Office

James Thomson
Petitions Attorney
PCT Legal Office

Tel.: (703) 308-6457

ATTORNEY DOCKET NO.: 639321.0005 (MIII-103)

Declaration, Power of Attorney, and Petition

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship is as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:
AN INTERNET CACHING SYSTEM AND A METHOD AND AN ARRANGEMENT IN SUCH A SYSTEM, the specification of which *(check one)*

☐ is attached hereto; or

☒ was filed on December 14, 1999 as Application Serial No. 09/445,845 and was amended on and as amended on December 14, 1999; and

PCT FILED APPLICATION ENTERING NATIONAL STAGE

☒ was described and claimed in International Application No. PCT/US99/21248 filed on 22 SEPTEMBER 1999.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above, and that it contains a full, clear, concise and exact description of the subject matter for which a patent is sought.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

Prior Application(s)

☒ (Check if applicable) I/We hereby claim foreign priority benefits under Title 35, United States Code § 119, by checking the box(es) below, any foreign application(s) for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

			Priority Claimed?	
9803246-9	**SWEDEN**	**24 September 1998**	[X] Yes	[ ] No
(Number)	(Country)	Day/month/year filed		
			[ ] Yes	[ ] No
(Number)	(Country)	Day/month/year filed		

☐ (Check if applicable) I/We hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Prior Provisional Application(s)

(Application Number) (Filing Date)

(Application Number) (Filing Date)

(*Note:* When the nonprovisional application is entitled to an earlier U.S. effective filing date of one or more provisional applications under Title 35, United States Code § 119(e), a statement such as "This application claims the benefit of U.S. Provisional Application No. _____, filed _____, and U.S. Provisional Application No. _____, filed _____." should appear as the first sentence of the description. In view of this requirement, the right to rely on a prior application may be waived or refused by an applicant by refraining from inserting a reference to the prior application in the specification of the later one.)

☐ (Check if applicable) I/We hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I/we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. Application(s)

(Application Serial No.)	(Filing Date)	Status (Patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	Status (Patented, pending, abandoned)

☐ (Check if applicable) I/We hereby authorize the U.S. attorneys or agents named herein to accept and follow instructions from _____ as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys or agents named herein and myself/ourselves. In the event of a change, I/we will notify in writing the U.S. attorney or agent named herein.

☐ (Check if applicable) In this continuation-in-part application, insofar as the subject matter of any of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint:

Barry Kramer, Reg. No. 20,622
Mark D. Giarratana, Reg. No. 32,615
James W. Jakobsen, Reg. No. 38,505
Steven J. Moore, Reg. No. 35,959
George N. Chaclas, Reg. No. 46,608
R. Thomas Payne, Reg. No. 30,674
Scott D. Wofsy, Reg. No. 35,413

of the firm of CUMMINGS & LOCKWOOD, whose address is Four Stamford Plaza, Stamford, CT 06904 ; and

as my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Please address all written correspondence to the following address:

George N. Chaclas
CUMMINGS & LOCKWOOD
P.O. Box 1960
New Haven, CT 06509-9958

Telephone Calls should be directed to Mr. Chaclas by dialing 203.351.4103.

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, declaration, power of attorney, and this petition.

Full name of first inventor: LINDBO, SVERKER
Residence: 40 Elm Street, Wellesley, MA 02481
Citizenship: Sweden
Post Office Address: 40 Elm Street, Wellesley, MA 02481

First Inventor's signature_____ Date _____

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